UNITED STATES ARMY MAY 1966

AVIATION DIGEST

HueyCobra
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UNITED STATES ARMY AVIATION DIGEST

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MAY 1966 VOLUME 12 NUMBER 5

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Cover: Sting of the HueyCobra, the Army's newest addition, soon to be felt around the globe.

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

The DIGEST is an official Department of the Army periodical published monthly under the supervision of the Commandant, U. S. Army Aviation School. Views expressed herein are not necessarily those of Department of the Army or the U. S. Army Aviation School. Photos are U. S. Army unless otherwise specified. Material may be reprinted provided credit is given to the DIGEST and to the author, unless otherwise indicated.

Articles, photos, and items of interest on Army Aviation are invited. *Direct communication is authorized to: Editor-in-Chief, U.S. Army Aviation Digest, Fort Rucker, Alabama.*

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LETTERS

Sir:

Upon reading the February issue of "Aviation Digest" I found, once again, an article on survival kits. I am in agreement with anyone who suggests a survival kit. Unfortunately senior commanders and staff officers do not seem to be aware that a survival problem exists. The most frequent comment I have heard is, "Survival! Hell, you can walk to the nearest GastHaus, here in Germany, in ten minutes and survive as long as your money lasts!"

This, however, is not always the case. For example, about a month ago an aviator experienced an engine failure at night in a Bird Dog. He and his passenger bailed out and were rescued almost immediately. The aircraft, however, was not found until two days later. What kind of survival situation would have existed had the aviator and passenger stayed in the aircraft and been injured in the crash?

Another "blank wall" I have experienced in trying to promote personal survival kits is trying to issue survival knives. TA 50-901 authorized survival knives to be obtained and issued to each person on flying status. I requisitioned and issued survival knives to all flying personnel and requested that they be carried on all flights. Everything went smoothly until our IG inspection.

The IG saw one of these knives in an aviator's Jepp case and almost hit the ceiling. It seems that these knives, as well as any other knife larger than a penknife, must be locked in an arms room and be issued and controlled just like a machinegun. This might be feasible if the arms room was located at the airfield. The billets, orderly room, and arms room, however, are located five miles away on the other side of town. This would require a 40 minute round trip before and after each flight to utilize these knives, but still secure them as required by regulations. This is clearly not feasible. A letter has been submitted through channels requesting that survival knives be exempted from the security requirement but until the regulation is changed the survival knives are useless to aviators.

Almost all of the problems of this nature I have experienced are caused by a lack of education or understanding of the problems of aviators, and aviation, by commanders, as well as staff officers. For example: The Seventh Army Regulation requiring all knives to be secured in arms rooms was written by the Provost Marshall and G-2 sections at Seventh Army. Had they been aware of the survival knife situation special allowances might have been made for aviators.

The moral of this story is be a salesman and talk aviation to everyone who will listen. Don't hesitate to let others know about your problems as well as your accomplishments.

CAPT WALTER L. BRAGG
Btry F, 26th Arty
APO New York 09175

Sir:

I read with interest your U. S. Army Aviation Digest and particularly those articles appearing under the title "Crash Sense." I am writing now to suggest that a crash, in which I was a passenger, be researched as a possible subject for an article, since, in my opinion, the aircraft was lost due to lack of mechanical understanding of the engines by both the pilot and copilot, who had had considerable time in this aircraft.

. . . The aircraft was a U-8, and it had just taken off with a full load of passengers, gas and luggage. It was climbing on low pitch to approximately 2,000 feet . . . when apparently the propeller on the right engine would not go to a higher pitch, and instead, went all the way to the lowest pitch and the engine began to run away. The pilots throttled back the engines but had no effect on the propeller which still remained windmilling at around 2000 rpm. This caused a very heavy drag, and the aircraft immediately began to lose altitude. It was obvious from the stall-warning that altitude could not be maintained, and the aircraft was put down, wheels up, in some dried fields. The aircraft was totally demolished; however, only minor injuries were sustained by the occupants. The point here, as I found out later, was that the engines on that aircraft were governed and could only run up to the specified maximum rpm, which theoretically, for short periods of time, would not do them unnecessary damage. If the pilots had known this, they would have gotten enough thrust from that engine, even with the propeller in low pitch, to enable the aircraft to make a commercial field . . .

I am sure that you can identify this accident from reports. Having talked to other pilots of U-8s, I have found only one that knew that the engine could not run away under such circumstances.

Congratulations on a much improved magazine. Keep up the good work.

COL ARTHUR M. MURRAY
Fort Jay, Governors Island
New York, N.Y. 10004

Dear Col Murray:

Your letter of 1 February 1966 to the Editor-in-Chief, U. S. ARMY AVIATION DIGEST, was forwarded to this organization. We have reviewed the accident report you recommended and agree with you that it would make an excellent source for information to be published in the Crash Sense department of the ARMY AVIATION DIGEST. A description of the accident, its cause factors, and prevention measures will be prepared for publication in the June 1966 issue.

Thank you for your comments about the DIGEST and for your suggestions.

COL WARREN R. WILLIAMS
Director, USABAAR

Daydreaming in the cockpit can have dangerous (and embarrassing) results

On A Long Wide Base For 09

Captain Joe J. Matthews

LIEUTENANT Clyde Navace (aviator-type) hurried out to the airfield in the late afternoon of a cold winter day. The place: Godman Army Airfield, Fort Knox, Ky. The mission: a passenger haul in an O-1A to Simmons Army Airfield, Fort Bragg, N. C., RON, and return the following day. The weather had been cold for the past three days, dropping to a low of -20° F. Several inches of snow had fallen, leaving the ground covered with its whiteness. Today, the weather was clear and the reflection of the sun's rays against the white blanket of snow cast a brilliance which was blinding to the eye. The day's high temperature had been 8° F.

Capt Matthews is an instructor, Operations & Intelligence Br, Command & Staff Div, Dept of Tactics, USAAVNS, Ft Rucker, Ala.

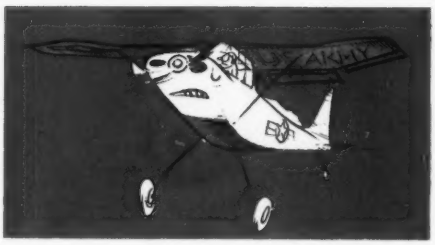
When Lieutenant Navace arrived, the passenger was standing by in operations. The next half-hour consisted of hurriedly checking en route weather, filing out, preflighting, and loading assorted bags and personal articles aboard the Bird Dog, which stood mute and inanimate against the cold carpet around it.

Following takeoff at about 1600 hours, Lieutenant Navace nursed the aircraft around to a southeasterly heading and settled back while the aircraft climbed to a cruising altitude of 5,500 feet. The flight plan called for 5 hours en route, which included a 30-minute fuel stop at Knoxville, Tenn. First leg of the flight was routine and uneventful with one exception: extremely cold air seeped in through the cracks around the windows. The free air temp gauge indicated -20° C., and the passenger's frequent gripes indicated his awareness of this condition. A moderately strong crosswind from the right necessitated a 10° drift correction to maintain course.

Arrival at McGee-Tyson Airport was on time, and no excessive delay was encountered in refueling and taking off again on the second leg of the flight. A new heading of approximately 100° was established.

Upon departing Knoxville, Lieutenant Navace called Knoxville radio, advised them of time of departure, and requested the latest winds aloft. Winds at 10,000 feet were reported to be 270° at 65 knots. Almost a direct tail wind! With this report Navace eagerly pushed the throttle forward with such intent as to imply that "time was a-wasting" and that the fastest route to 9,500 feet was too slow.

At 9,500 feet the free air temp



gauge read a cool -26° C. Computations indicated a true airspeed of 98 knots. After making a couple of visual fixes, Lieutenant Navace computed his groundspeed to be an astonishing 161 knots!

Visibility was practically unlimited and the city of Asheville, N.C., and the Smokey Mountains passed underneath very quickly as the 0-470 purred a monotonous hum through the night. For some strange reason the heater appeared to be working better and the cabin of the little Bird Dog was beginning to feel quite comfortable for a change.

Things were looking up as the aircraft left the mountains behind and approached the flat country of North Carolina. A sense of warmth and complacency possessed Navace as he sat back relaxed, realizing that the worst part of the flight—the mountains—was past and that the destination would be coming up quickly due to his groundspeed of 161 knots. He had never had a groundspeed which even came near this figure and he drank in the goodness of watching the lights of the small towns flash by underneath with such an apparent rate of speed as would be encountered at 2,000-3,000 feet.

The area was heavily populated and Navace could see the lights of a dozen or more towns at any time. Airport beacons could be seen in any cardinal direction, winking their tiny signals and guaranteeing to all airborne eyes that a safe haven existed at that point, thus adding to the sense of security. Towns were getting larger and the gayly colored lights danced and glowed like dying embers of a cozy campfire. The light clusters appeared as stepping stones or bases which spanned out to the horizon amid the black voids which represented the rural areas. The lights were friendly and Navace felt their magnetic attraction as he spanned each void between.

Flirtation with the dancing lights and winking beacons ended abruptly! Navace suddenly realized that he had been daydreaming. A quick check around the cockpit revealed that his heading was still 100°, altitude was still 9,500 feet, and all other instruments appeared to be normal. The passenger was slouched over in the back seat and appeared to be dozing. An awareness came to Navace that nothing had been said by either the passenger or himself for the past hour or more.

Navace got out the map and tried to recall his time over Asheville, and whether or not he had passed Charlotte. The fact that he could see a dozen towns around only added confusion to the situa-

tion. A quick reference to the map under the red glow of the maplight didn't reveal any clues to his whereabouts. He wondered if his groundspeed was holding steady and if so, how far it had carried him. Had the wind shifted? If so, the velocity could have carried him several miles off course.

Several minutes were spent trying to fit the various towns on the ground to the towns on the map. Several discrepancies crept into the picture, such as airport beacons blinking where no airports were indicated on the map, lights of a small town that didn't appear on the map, or lights of automobiles outlining a busy highway that didn't exist.

During the anxious study of the map he forgot about the heading, and on several occasions looked up to discover his heading 30° or 40° off from the proper heading. On one occasion he found himself in a shallow turn with about 20° bank although he had not felt any sensation of turning while studying the map.

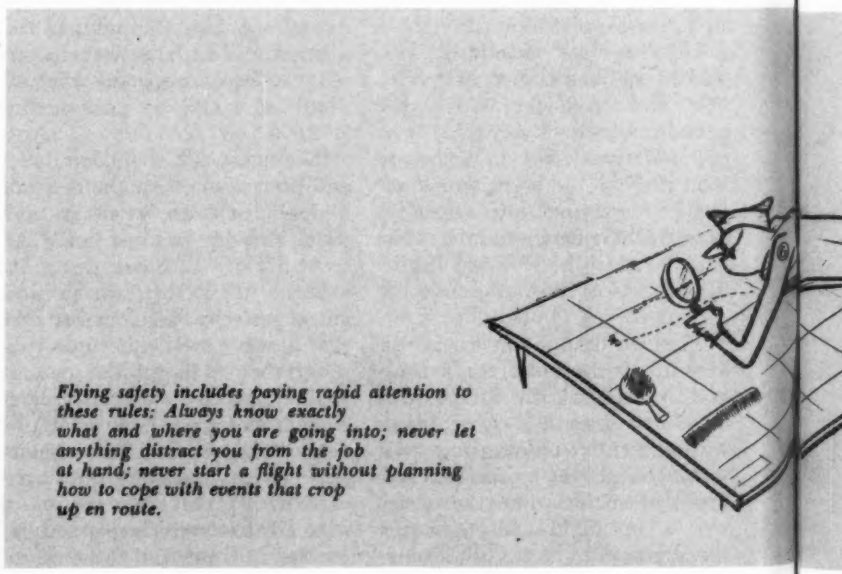
The situation was becoming disgusting. If only he could find Charlotte, the only large town in that general area. Had he passed it already? A 360° turn failed to disclose that large glow on the horizon which would be immediately recognizable as Charlotte, and which would end his dilemma. The aircraft was wandering aimlessly about the dark sky as indecision mounted and gripped Navace as he tried to solve his puzzle. A faint reminder from the principles of navigation caused him to turn the aircraft back to the proper heading. It took considerable mental effort to hold the heading steady as he wrestled with the problem.

The passenger, now aroused, squirmed in the back and seemed to sense that something was wrong although nothing had been said. The bright glow of the cigarette, which he had lighted and was now tugging on, mirrored an expression of puzzlement and he stared at the back of Navace's head for some indication of what was happening. At this point Navace broke the spell. He said something about being slightly off course but that the original heading was being maintained and there was nothing to worry about. This seemed to reassure the passenger completely. He settled back and resumed a methodical drawing on the cigarette while staring out the window.

At this point, Lieutenant Navace made a decision. It was unlikely that he was far off course because he had maintained a steady heading most of the trip. The last visual fix had shown him to be on course and he doubted that the winds had shifted enough to alter his ground track. Obviously he must have been daydreaming, as he passed by Charlotte and somehow failed to notice it. Based on this conclusion Navace decided to hold the original heading of 100°.

In another 30 minutes he should be able to see the three airport beacons in the Fort Bragg area. These three beacons were distinctive and could not be mistaken. The two on the left side would be split beams signifying Pope AFB and Simmons AAF, and the one on the right was a single beam identifying Fayetteville Airport. He had seen these beacons many times before and knew that the mere sighting of them gave a positive identification. No other combination like this existed for hundreds of miles. With this conclusion and reasoning in mind, he relaxed again and joined the passenger in lighting a cigarette and staring out the window, content to wait out the next 30 minutes.

Forty minutes later Navace knew something was wrong! He peered intently over the nose of the aircraft into the blackness before him. No beacon anywhere! He rechecked his heading and retraced his proposed ground track on the map. Was it possible that the beacons could be out? Possibly one—but not all three at the

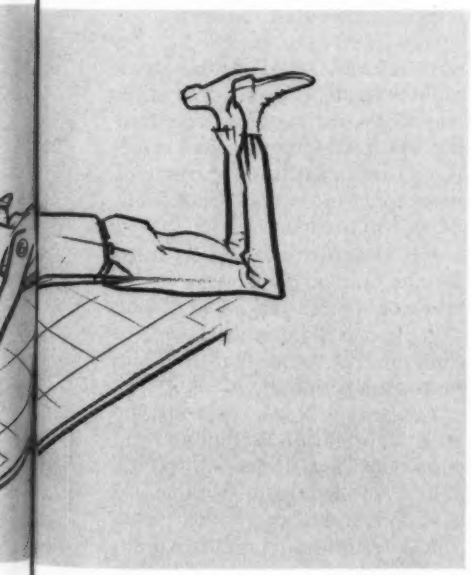


Flying safety includes paying rapid attention to these rules: Always know exactly what and where you are going into; never let anything distract you from the job at hand; never start a flight without planning how to cope with events that crop up en route.

same time. Something was wrong, but what?

At about the 10 o'clock position he could see the faint glow of two large towns far out on the horizon. He estimated the distance to be approximately 50 miles away and 10-15 miles apart. Was there an airport beacon between the two towns? Yes! He could faintly see the tiny strobe of light as it blinked at regular intervals. It had to be Raleigh-Durham. He felt better now. He gauged his relative position on the map and decided that perhaps the Fort Bragg local area was shrouded with low visibility, or perhaps a few low clouds in that area were hiding the lights of the probing beacons. There was nothing to do except maintain the present heading until they came into view.

Ten minutes later, however, the lights of Raleigh-Durham were directly under the left wing and still no beacon in sight. Navace was completely baffled. What could have gone wrong? Where could he possibly be? Was it possible that the towns on the left were not Raleigh and Durham? The situation was not only puzzling but was becoming embarrassing. The passenger, who had been content only a few minutes ago, was now becoming restless again and began shifting around in the back seat.



Navace couldn't stall any longer. As he swung the aircraft around to the left, he explained to the passenger that somehow they had gotten off course. He would proceed directly to Raleigh-Durham, and after positively identifying it they would then swing to the southerly heading of 190° which would unmistakably take them to Fort Bragg. For some strange reason it never occurred to Navace that the 190° would return them to approximately their present position. Logical reasoning was crowded out of Navace's mind by the obsession which compelled him to turn toward what he had supposed to be Raleigh-Durham. He had been over the Raleigh-Durham complex many times before, and he felt certain that he could positively identify the area by flying over it.

After resigning himself to the fact that the flight up to the two towns would take 30 minutes or more, a small percentage of his reasoning process came back to him as he suddenly thought of the low frequency loop receiver aboard the aircraft. For the second time now an anxious shuffling and study of the map under the red glow of the maplight prevailed; for the second time the aircraft wandered aimlessly as the heading went to pot.

After about 5 minutes of tuning and listening in vain for a familiar code letter identifier, Navace gave up with a shrug of indifference and resumed the direct heading to the two towns, which now appeared much closer. He rotated the elevator trim and started a descent which he guessed would take him down to 1,000 feet or less by the time he reached Raleigh. The fuel mixture was put at full rich as he started the descent. A check of the fuel gauges indicated enough fuel for another 1½ or 2 hours. At least this was something in his favor, he thought.

A couple of passes over Raleigh at about 1,000 feet reassured Navace because he thought he recognized some of the buildings in the downtown area. Thirty minutes later, however, Navace knew he was lost. He had departed the town on a heading of 190° and had climbed back to 3,000 feet. No beacons, no towns, and only a few scattered lights of rural areas lay in front of the aircraft. He thought about landing at some lighted airport and inquiring as to his location but he decided against it for the present. Instead, he reversed course and headed back to the cities he had thought were Raleigh-Durham.

He would just have to call Raleigh-Durham radio and announce his situation. He hated to do this but could think of no safe alternative. Navace dreaded the sound of his voice as he related the situation to the radio facility. He envisioned that every aircraft in the air at that moment must be tuned to that frequency and that thousands of pilots, many of whom would undoubtedly recognize his voice, were listening with tight smiles etched across their faces as they too heard his sad story. It took determination and banishment of pride as Navace answered the ground controller's questions. He made a special effort to sound as calm and casual as possible. Maybe some would think this was a practice DF steer or radar vector.

In addition to the humiliation, he wondered what his passenger

must be thinking. The image that he had tried so hard to instill with the passenger from the beginning of the flight undoubtedly was shattered now. The swiftness and sureness of filing out and preflighting, the professional-sounding lingo which he used in talking to ground personnel, the smoothness of the position reports he barked out to en route stations, the calm and casual touch he had applied to the controls and instruments, and the professional-looking visual sweeps he had made around the horizon en route—all these things were gone now. In its place in the front seat the passenger probably saw a confused man without the dignity of his armor, and one who was bent on destroying both of them.

His thoughts were interrupted from time to time as the ground controller relayed instructions from the radar controller. The voice from the ground was friendly and reassuring as he instructed Navace to make first one turn and then another for identification. After several minutes, Navace wasn't sure how long, the controller announced that they had verified his position. He was not 5 miles south of Raleigh-Durham as he had thought; instead he was 5 miles south of the Greensboro-High Point Airport—approximately 60 nautical miles westnorthwest of Raleigh-Durham.

How simple it was to make the map fit the ground features, or vice versa, once he knew his position. How stupid it had been of him to become "temporarily disoriented," he thought, as the cockiness came back to his voice and the confidence began to well up inside him again. Apparently none of the confidence rubbed off on the radar controller, for he insisted on giving Navace a radar vector to Simmons AAF from his present position. Navace accepted the periodic vector instructions although he now thought they were unnecessary. He would leave it that way though. After all, they had come through when he needed them, so he would let them have their fun. They probably needed the practice anyway.

With the assistance of the radar vector for the rest of the flight, Navace had nothing to do except hold the heading given to him. He wasn't in a talkative mood because his wounded pride hadn't fully recovered. He let his thoughts drift back to the beginning of the flight in trying to determine what he had done wrong. In planning the flight and filing out he recalled that he had hurriedly grabbed some maps and barely took time to draw a straight line along his proposed flight path. No prominent checkpoints or time checkpoints had been drawn on the map and no detailed study of the map had been made. Would this have made a difference?

Headings he had held had simply been "eye-balled" back in operations by holding the string stretched between two points on the map and estimating the heading. Had this caused his trouble? By taking a few seconds more he could have plotted the heading accurately. He had computed his winddrift corrections sloppily—not by measuring with a computer but by "throwing in 10°," and if that wasn't enough, "throwing in 5 more." He knew this wasn't the proper procedure, but he, like many other aviators he knew, had allowed himself to slip into this habit.

You can afford to take a wrong turn while daydreaming on a stroll down the street or while eyeballing a Playmate, but inattention while planning a flight and flying can be disastrous. Stay alert!

All of these things could have been contributing factors. However, he slowly became aware of the one thing that he had known from the start had caused his disorientation: he had failed to stay alert and keep up with his position on the map. He had allowed himself to become complacent and inattentive, brought about by a feeling that everything is going well. It had given him an overconfidence which had lulled him into daydreaming.

Lieutenant Navace equated this with a statistic he had read once which stated: More accidents on the highway occur on straight, level stretches than on dangerous curves. He began to see that the same elements that cause automobile accidents on straight roads could have caused him to get lost, namely the hypnotic effect sometimes induced during periods of monotony or a feeling of well-being.

His thoughts were interrupted as the radio controller's voice crackled over the air advising him that he was 5 miles northwest of Simmons AAF, and that the radar vector was terminated.

Lieutenant Navace was making mental promises to himself that he would never allow this situation to occur again as he called Simmons tower and began easing the O-1A into a long left base for runway 09.

Do you qualify for the new

Aircraft Crewman Badge

AN AIRCRAFT crewman badge similar in appearance to the silver wings worn by an Army Aviator has been authorized by the Army. Individuals may wear the badge on either a temporary or permanent basis depending on certain requisites.

To wear the wings on a temporary basis, individuals must be on flying status either as a crewmember in the case of crewchiefs and flight engineers, or as noncrewmembers in the case of observers, medical aidmen, gunners, aircraft maintenance supervisors, or technical inspectors. Personnel must also meet physical and duty requirements as outlined in AR 672-5-1, C 11.

Individuals can wear the wings permanently if they

- are school trained for or served in one of the mentioned duty assignments for at least 12 months (not necessarily consecutive);
- are incapacitated for further flight duty as a result of being wounded by enemy action or as the result of an aircraft accident for which he is not responsible;
- participate in at least 15 combat missions under probable exposure to enemy fire while serving in a duty as mentioned.

Like the aviator's wings, the crewmen badge is awarded in three degrees of qualification. The aircraft crewman badge pictured above is initially awarded. A senior aircraft crewman badge with a star above the shield is awarded E-4s or higher who have 7 years in one or more of the principal duty assignments. A master aircraft crewman badge with a wreath and star is awarded E-6s or higher with 15 years. (Consecutive times are not necessary to become eligible for any of the badges.)

Personnel who have met these requirements at any time since 1 January 1947 are eligible for the badge. The new wings will replace the mechanic "ladder" badge which was awarded with bars to crewchiefs and mechanics.

Aircraft Armame

Contributed by U. S. Army Ordnance Center and Sch

IN TODAY'S Army there is a new axiom. It goes something like "Where there's a machine, there's a repairman to fix it."

The relatively recent authorization of certain weapons on Army helicopters is no exception. By the time the first helicopters fitted with authorized weapons kits reached the field, a new repairman MOS was in the making and school training of these specialists had been scheduled.

Training site chosen for MOS 45J, aircraft armament repairman, was the U. S. Army Ordnance Center and School at Aberdeen Proving Ground, Md. It is the site for school training in almost two score other enlisted supply and maintenance MOSs. Among them are such related MOSs as fire control instrument repair, small arms repair, field and turret artillery repair, and small missile systems repair.

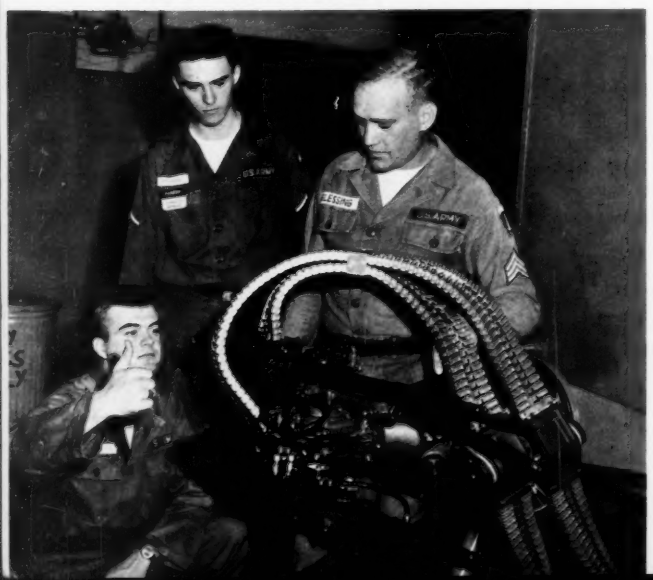
A basic electronic trainer is used in solving a series of problems included in the initial 3 weeks of training

The first aircraft armament repair course began in April 1963. During FY 64, 23 classes were programmed and graduated. Ninety-six classes are scheduled for FY 66 training at the Ordnance Center and School. The course is covered in 15 weeks. As other aircraft armament subsystems become available, instruction will be lengthened to 17 weeks. Successful completion of the course results in the award of MOS 45J20. This MOS is currently authorized in grades through E-7.

Under requirements of MOS 45J an aircraft armament repairman must be capable of performing all required maintenance operations on the aircraft armament subsystems except complete rebuild. In addition, he is trained to handle, store, and inspect required ammunition; load and unload weapons; and troubleshoot the subsystem as required.

Initial phase of training at the Ordnance Center and School is a 3 week block on basic electronics, a particularly important requirement since the weapons have electronic components. For this reason

A student team boresights the M-6 aircraft armament subsystem during training at the Ordnance Center and School



These students mount a third M-22 missile to the lefthand boom of a UH-1 helicopter mockup during aircraft armament repair training

nt Repair Course

School, Aberdeen Proving Ground, Maryland

student aptitude or prior training in electronics is desirable. Currently, the minimum prerequisite for attendance is a score of 100 in the general maintenance aptitude area.

Instruction includes the following aircraft armament subsystems authorized for use on Army helicopters:

- The M-2, consisting of one 7.62 mm machinegun mounted on each side of a lightweight observation helicopter.
- The M-6, consisting of two 7.62 mm machineguns mounted on each side of a utility helicopter.
- The M-3, consisting of 2.75 inch folding fin aerial rockets mounted on each side of the UH-1.
- The M-22/UH-1B, consisting of three wire guided antitank missiles mounted on each side of the aircraft.
- The M-5 subsystem, consisting of a 40 mm automatic grenade launcher mounted in the nose of the helicopter.

Qualified aircraft armament repairmen are assigned either to units authorized armed aircraft or to maintenance units supporting them.

In his job with a unit having armed aircraft the repairman stores and handles ammunition for the armament subsystems in use, including the mating of rockets with warheads. He is also responsible for loading before missions and unloading upon completion of missions. In the area of maintenance he is responsible for the organizational phase—boresighting, daily safety and maintenance checks, preflight checks, etc.

At support level the repairman must be able to perform all procedures between organizational maintenance and complete rebuild. He may function at the support unit site or as a member of a mobile or airmobile repair team.

Instructor watches students install a 4th module on the rocket pod of the M-3 weapons subsystem

Training includes installing the right boom of the M-22/UH-1 weapons subsystem (to be replaced shortly by a transistorized version)

Student installs the ammunition chute of a M-2 weapons subsystem while the instructor checks the operation

Lieutenant Colonel Raymond E. Dickens

Col Dickens, former CO, 18th Otter Co, is now Deputy CO, Officer Student and WO Candidate Affairs, USAAVNS, Ft Rucker, Ala.

OF THE MANY aviation units operating in Vietnam, probably least publicized are the Otter units. The U-1A Otter, the Army's single engine light transport aircraft, was rapidly approaching obsolescence in favor of the newer and bigger CV-2 Caribou. However, the conflict in Vietnam gave the old girl a chance to prove that she was by no means finished.

January 1962 saw the 18th Aviation Company, formerly of Fort Riley, boarding the *USNS Core* which soon set out on a westerly course. On 30 January, just after departing Guam, its destination was announced—Vietnam.

The 18th Aviation Company, the first fixed wing unit to arrive in Vietnam, established its headquarters in the coastal town of Nha Trang and immediately spread its platoons from one end of South Vietnam to the other. The Otters provided support sorely needed in all corps areas.

U-1As, the Army's largest single engine transport, are capable of operating on short unimproved strips carrying up to eight passengers or a ton of cargo. It is old and slow—maybe a 100 knots if you push it—but is reliable and gets the job done.

Later the 18th was reinforced with another platoon, bringing its strength to 24 aircraft. These ships operated in all sorts of terrain, ranging from the mountainous areas of the north to the delta in the south. Weather often required either climbing on top and letting down through a hole at the destination or flying at treetop level. Although the Otters did not receive as hot a reception from the Viet Cong as did the choppers, they did take their share of hits.

Many have wondered why the Otters are not mentioned more often. As far as any single spectacular event or any unusual employment of the U-1A is concerned, you'll probably not come up with any. What is outstanding is the overall support rendered throughout Vietnam since the arrival of the 18th.

Thousands of individuals at the many Special Forces camps and advisory groups can and have given personal witness to the support rendered by the Otter crews and their ships. In a situation where supplies and equipment must come in by air, the Otter has become a welcome sight to those manning isolated outposts and camps throughout Vietnam. You name it and if it will fit in the door, it has been carried. All sorts of supplies and equipment, from C-rations to livestock and poultry, generators, gasoline, and ammunition have been delivered to more than 150 strips.

The delivery of items which greatly affect a fighting man's morale—mail, PX items, and even Thanksgiving and Christmas turkeys—must also be included in the

myriad articles transported by Otter. Even though most camps boasted of a landing strip, there were some less fortunate camps who had no place for a ship to land. In this situation, supplies were dropped by parachute.

Not only have supplies and equipment been continuously transported, but thousands of passengers have used the "Otter Lines." American, Vietnamese, members of many Allied Nations —military, from privates to generals, civilians including VIPs, entertainers, newspaper correspondents and photographers—have depended upon this low and slow but reliable ubiquitous transport. Replacements are delivered to their new units, repair teams are often transported to the camps to effect repairs on equipment which is vital to the successful accomplishment of the mission. CV-2s and Air Force 123s have taken over the heavy hauling, but plenty of business is still left for the U-1As.

Normal passenger and cargo runs make up the majority of the flying done by the Otter crews; however, this by no means is the extent of their operations. Aircraft have been made available at times for Special Forces personnel to make training jumps to maintain their proficiency. U-1As are frequently used to drop flares for battlefield illumination and/or surveillance of an area. When a VC boat loaded with arms and ammunition was spotted south of Tuy Hoa last spring, the Otters illuminated the area throughout the night. Each night you'll find U-1As loaded with flares, their crews standing by to take off on a moment's notice.

Another vital role shared by the Otters is that of medical evacuation. Scores of sick and wounded have been flown in U-1As to hospitals at Saigon and Nha Trang. Many of these evacuations have been accomplished under extremely marginal conditions and many lives have been saved by the skill of the crews and their thorough knowledge of the terrain. These evacuations have not been limited to friendly military forces. Frequently the call is received that a wounded VC at one of the remote Special Forces camps has information that would be of value to our forces.

As an example, the Otter section at Da Nang received a call late one afternoon requesting that a valuable VC prisoner be picked up at the isolated camp at Gia Vuc and then taken to the hos-

Dropping bundles or people; hauling ice cream or VIPs

pital at Nha Trang. Gia Vuc is tucked away in a valley southwest of Quang Ngai and is surrounded on all sides by VC infested mountains, making it hazardous to approach even during daylight. An Otter was dispatched immediately, arriving at the camp as darkness closed in. The wounded prisoner was loaded on board and the flight through the deep valley was made in total darkness—that is, except for the tracers which were coming from the mountains on both sides as well as from the valley floor.

Approximately 0200 hours on 7 February 1965, both camps at Pleiku were hit hard by the VC. At this time the Otter crews were living at the MACV compound on the north side of town. When the attack came, they immediately took up their fighting positions. As soon as the fighting stopped and wounded had been given first aid, the platoon commander voluntarily organized a convoy and took his Otter crews across town to Camp Holloway.

On arriving at Holloway they found the air filled with smoke from burning helicopters. Their Otters had miraculously escaped damage. Quickly rigged for litters and with crewchiefs guiding them, they taxied across a ramp stewn with rifle grenade duds and burning helicopters to where they could pick up the wounded. Loaded with some of the more seriously wounded, the ships took off through the dust and smoke and the sporadic enemy fire.

Upon delivering the wounded to the 8th Field Hospital in Nha Trang, the crews were offered the opportunity to rest since the CV-2s and the Air Force had taken over. However, the Otter crews chose to return to Pleiku where they continued to fly command and liaison flights throughout the day.

Surveillance, reconnaissance, and radio relay also make up a part of the daily routine, but in addition to this great variety of missions, many personal services are rendered. The Otter crews have great respect and admiration for those who man the remote camps, and will go out of their way to try to make life a little more pleasant for them. On a trip into a Special Forces camp which had just been opened, the pilot asked the camp commander if there was anything he needed that might be brought in on the next trip through. The young captain said, "No—well, yes, we'd sure like to have some ice cream."

Ice cream was rather hard to come by, and transporting it was even more difficult. However, on return to his home base, the pilot found that a mission was going to the same camp on the following day. A quick check of the area produced a couple gallons of ice cream. With the help of mess personnel, the frozen goodies were packed in ice, loaded aboard the U-1A at the last minute and delivered to a surprised but grateful team.

This is just one of the multitude of "extras" accomplished by the Otter crews. The friendly greetings and the genuine appreciation shown by those manning the camps provided more than adequate return for the extra effort put forth in rendering these services.

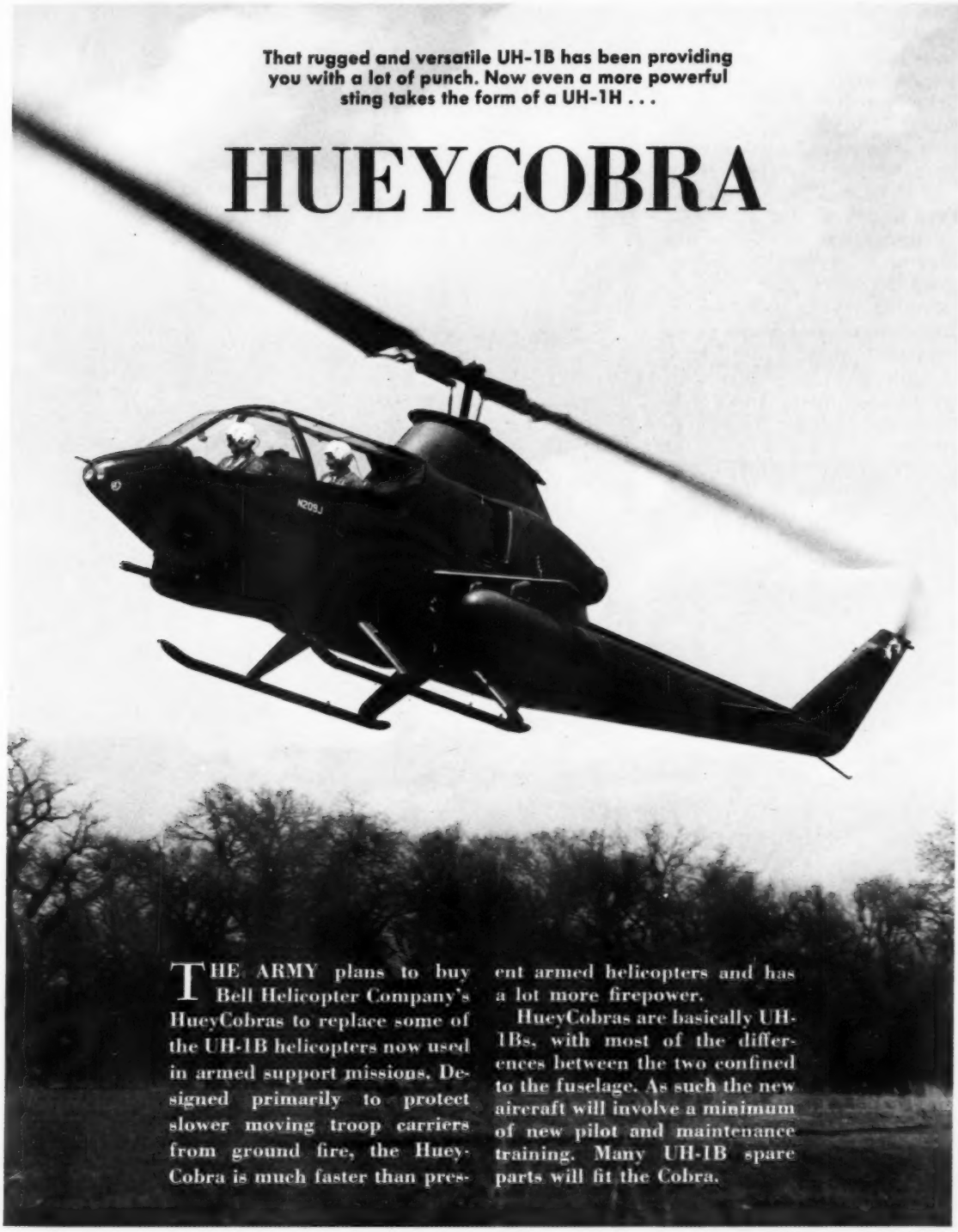
Otters were placed in direct support of each of the four Vietnamese corps. Missions were routed through the Tactical Operation Centers, through the Combat Operation Centers to the Otter platoon or section. About 75 percent of the Otter pilots arriving in Vietnam had just completed flight school and 25 hours of transition in the U-1A. Upon their arrival at Nha Trang, they are given a local area checkout to familiarize them with the strips, weather and terrain in Vietnam. On completion of this checkout, they are released to one of the platoons. There they fly with the more experienced pilots until they are completely familiar with the area as well as with the enemy situation. Flying from 75 to 100 hours per month, it doesn't take long for these young men to become seasoned aviators.

Not to be forgotten are the crewchiefs and maintenance crews who maintain these old ships. They are a dedicated lot who do a marvelous job in keeping the Otters flying day after day. The company administrative personnel, the supply section, commo and mess have also contributed immensely to the successful completion of the mission. The 18th Aviation Company's Otter patch with its motto, "Low, Slow and Reliable" is worn proudly by the men of the company.

Until recently, the 18th was the only Otter company in Vietnam. The 54th arrived from Fort Ord and in October 1965, took over the support of the III and IV Corps areas. With the addition of these aircraft and with the continued spirit and dedication demonstrated by the crews, the Otter will certainly continue to build the fine reputation it has enjoyed in the past.

That rugged and versatile UH-1B has been providing you with a lot of punch. Now even a more powerful sting takes the form of a UH-1H . . .

HUEYCOBRA



THE ARMY plans to buy Bell Helicopter Company's HueyCobras to replace some of the UH-1B helicopters now used in armed support missions. Designed primarily to protect slower moving troop carriers from ground fire, the HueyCobra is much faster than present armed helicopters and has a lot more firepower.

HueyCobras are basically UH-1Bs, with most of the differences between the two confined to the fuselage. As such the new aircraft will involve a minimum of new pilot and maintenance training. Many UH-1B spare parts will fit the Cobra.

According to the manufacturer, the pilot model Cobra can fly at about 157 knots. On a mission of some 50 nautical miles, the Cobra could get to the combat area more quickly than UH-1D troop-carrying helicopters and a little sooner than the Chinook troop transport. Once the Cobra is on the scene, it can deliver twice the firepower and operate over the target area three times longer than present armed helicopters.

Reduced drag, a beefed up engine, and a new rotor system are responsible for the high speed. The housing around the rotor pylon section is streamlined, and low flush-type inlets for the engine have been added.

Fuselage design is the most noticeable change from the Huey. Originally the UH-1 was designed as a medical evacuation helicopter. It is 100 inches wide so it can take a litter sideways. In comparison, the Cobra fuselage is a narrow profile only 36 inches wide.

UH-1Bs use the Lycoming T53-L-11 gas turbine engine with a standard day rating of 1,100 horsepower. The Cobra will use the T53-L-13 engine with a standard day rating of 1,400 horsepower.

The L-11 and the L-13 engines have the same outside dimensions and are physically interchangeable. An additional 300 horsepower is obtained by adding another power turbine stage and another gas producer turbine stage.

Bell's new Model 540 "door hinge" rotor system is used in the Cobra. This system provides increased speed and reduces maintenance by using lubrication-free Teflon hub bearings.

Flight instruments and communications equipment in the UH-1B are also in the Cobra. The gunner is located forward and slightly lower than the pilot. This allows both to have a wider field of view. If something should happen to the pilot, the gunner can control the aircraft by means of side arm type cyclic and collective pitch handles. The gunsight is mounted on a shaft in the center of the gunner's position.

The same flight instruments and communications equipment found in the UH-1B are also in the Cobra. Pilot's sight is for aiming rockets slung beneath stub wings.

Cobra mounts some of the same armament as the UH-1B now flying combat missions in Vietnam. It is designed to take the XM-134 machinegun, M-75 40 mm grenade launcher, and 2.75 inch folding fin aerial rocket.

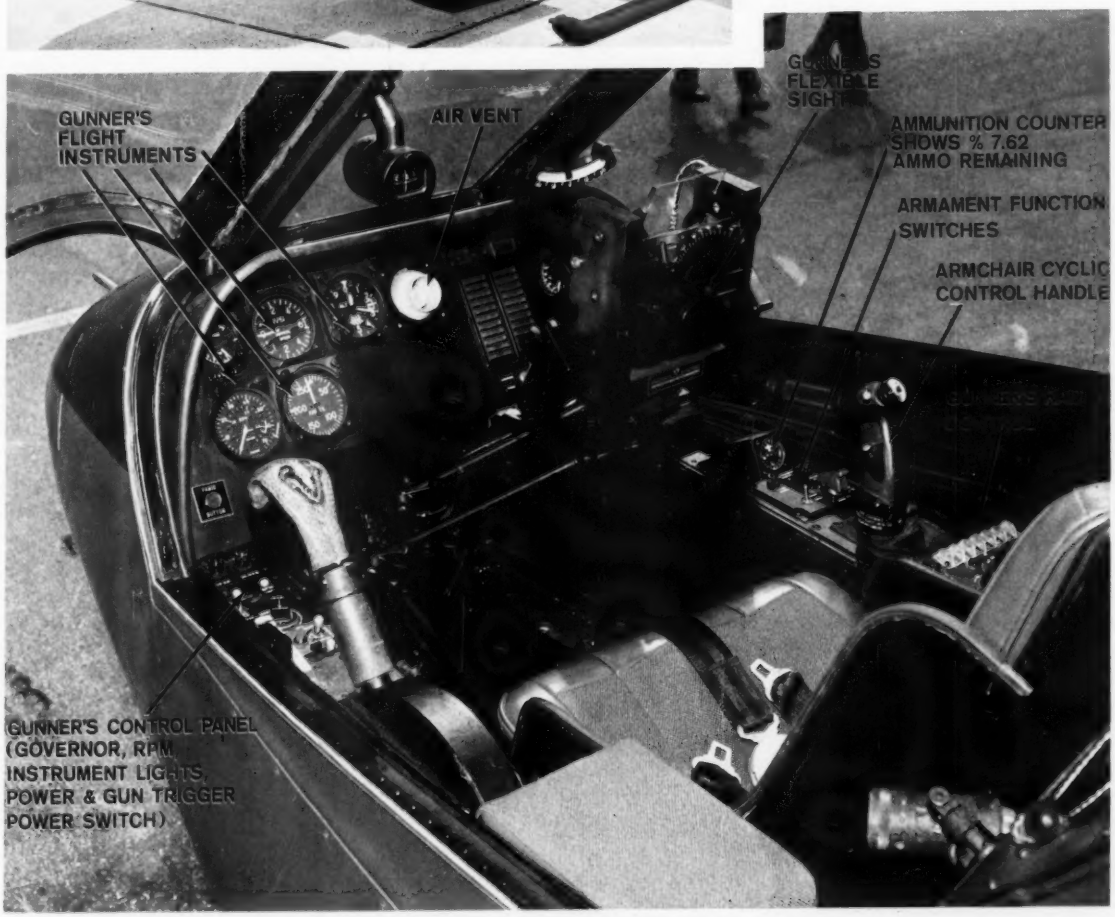
Either the grenade launcher or the machinegun can be housed in the chin mounted TAT-102 tactical armament turret. The TAT-102 has an azimuth coverage of plus or minus 120°, maximum elevation of 25° and maximum deflection of 65°. Folding fin rockets are hung on the stub wings.

Seats are made of Ausform armor—two steel alloys in sheets mechanically welded together. The outer sheet breaks up the bullets and the inner sheet keeps the fragments from penetrating.

Ausform armor is also used as side panels for the seats. These panels can be raised or lowered as required for protection in hostile areas. Other vital areas of the helicopter are also protected with panels of the armor material.

The gun sight is mounted on a shaft in the center of the gunner's position. Chin mounted gun turret under nose moves with sight. Ammunition loading is on each side of fuselage.

The gunner may control the aircraft by means of side arm type cyclic and collective pitch handle


GUNNER'S FLIGHT INSTRUMENTS
AIR VENT
AMMUNITION COUNTER SHOWS % 7.62 AMMO REMAINING
ARMAMENT FUNCTION SWITCHES
ARMCHAIR CYCLIC CONTROL HANDLE
GUNNER'S CONTROL PANEL (GOVERNOR, RPM, INSTRUMENT LIGHTS, POWER & GUN TRIGGER POWER SWITCH)

If you are newly assigned to Vietnam here are some hints that will help you

Make the Most of MAINTENANCE

Major Richard R. Hatton

THE SWEETEST words a good helicopter mechanic can hear are "It flies as smooth as silk."

Wherever these mechanics are stationed they knock their brains out trying to figure out ways to keep their aircraft flying smoothly. The strange thing is that little tricks that work in one part of the world won't necessarily work somewhere else. Perhaps it's the moisture or dust in the air, the elevation above sea level, or some such thing that makes the difference. In any case, when a mechanic is transferred from the cold of the Bavarian Alps to the heat of the Yuma Test Station he must change his way of doing things.

In Vietnam, helicopter mechanics have learned certain tricks that help with their problems. These are not all by the book and some won't work in the United States or other parts of the world. For this reason I do not recommend them for general adoption. But if you are newly assigned to Vietnam or if you are on the way, here are some of the things we learned.

Our big problem seemed to be with our helicopter flying like a freight train running on an old road bed. The condition usually occurs under a heavy load on a hot day. The vibration does not appreciably change with an increase or decrease in airspeed. At one time it may feel like a vertical and the next a lateral vibration, sometimes just a general overall shake, with increasing and decreasing intensity.

We found that usually the pitch change links are worn (within tolerance of wear but a difference in the wear of the two links), transmission mount dampers are weak, or the stabilizer bar dampers are weak or out of time.

The first step to correct this is an easy one. Measure the pitch link and set the stabilizer bar dampers in equal time.

If this fails, take the helicopter up. A rapid, but controlled, fore and aft movement of the cyclic in forward flight will cause it to make some movements around its lateral axis. If the transmission mount dampers are normal, there will be three or four lateral kicks and all induced vibrations should stop. If they are not normal, the induced vibrations will tend to diminish very slowly in a lateral direction.

Maj Hatton is Chief, Projects Maintenance Br, Logistical Evaluation Div, U. S. Army Aviation Test Board, Ft Rucker, Ala.

If the induced vibration does not stop, the trouble points more in the direction of transmission mount dampers. The next maneuver should be a cyclic, climbing turn. If the vibration turns into a definite 1-1 vertical pounding during the turning climb the cause is probably the stabilizer bar dampers.

Change the stabilizer bar dampers and make another flight check. While at a hover make the two or three fore and aft cyclic movements. At this point there will be no definite lateral movements but a general all-around shaking. If the movements do not subside with a reasonable dampening action, the transmission mount dampers are probably weak and require change.

The next major cause of vibration writeups in Vietnam is the 1-1 vertical. As shown above, a 1-1 vertical can be caused by stabilizer bar dampers. This usually occurs in cyclic climbs and climbing turns but does not generally persist in forward level flight.

When it has been established that the vibration is a 1-1 vertical, blade track is involved. At this point the helicopter should be tracked and the degrees of trim tab be measured and recorded in grease pencil on the chin bubble. When blades indicate an intrack condition, the helicopter should be flown for check.

If the 1-1 vertical vibration persists, a 3° positive trim tab bend should be made and another flight flown. The chin bubble recording should be changed to the new setting. A slight lateral vibration at a hover will likely turn into a vertical at forward flight. From this 3° bend it is necessary to feel whether the 1-1 has increased or decreased to decide what direction to continue. Tracking is no longer required because of the 1-1 vertical in an intrack condition. All you are looking for is a smooth helicopter.

When the writeup of a 1-1 lateral appears in the -13, the helicopter should be flown by a maintenance officer before alterations begin. In Vietnam four number 30 drill size holes are put in the blade tips. To dissipate moisture upon establishment of a 1-1 lateral, the rotor head and blades should be balanced as a unit. If this is not possible it is strictly a game of weights in and weights out of the blade retaining bolt. This is a very touchy area, and if other blades are available a change or two is suggested.

The final vibration we had to worry with is the high frequency type. These seemed to cause more discomfort, but were the least fatiguing, to both helicopter and pilot. The high frequency vibration can be attributed to any item in the helicopter rotating at an rpm above that of the main rotor rpm.

Most frequent offender is the tail rotor blades and hub assembly out of track. This can be detected by the "high freq" remaining both in level flight and autorotation. Tracking and pitch change link adjustments are required to correct this.

The problem of isolation of the "high freq" is a major one. It must be remembered that during an autorotation the turbine engine will usually maintain 6600 rpm. The short shaft is usually found to be a cause of high freq. After the couplings have been checked and found to be correct, a repack of the short shaft might save some time and energy. Of course a flight is required to check every correction.

A problem that follows along with the high freq is the pedals

Vibrations usually occur under a heavy load on a hot day

motoring in flight. The way to correct this is have the crewchief move the clamp up and down the two lines, just forward of the baggage compartment, just off the tail rotor servo, until the motoring stops.

In Vietnam conditions are rough and mechanics soon learn the value of scheduled maintenance. It can and does save a lot of down time when done properly and safely. The periodic is the major inspection, and it has been found that a little extra here goes a long way.

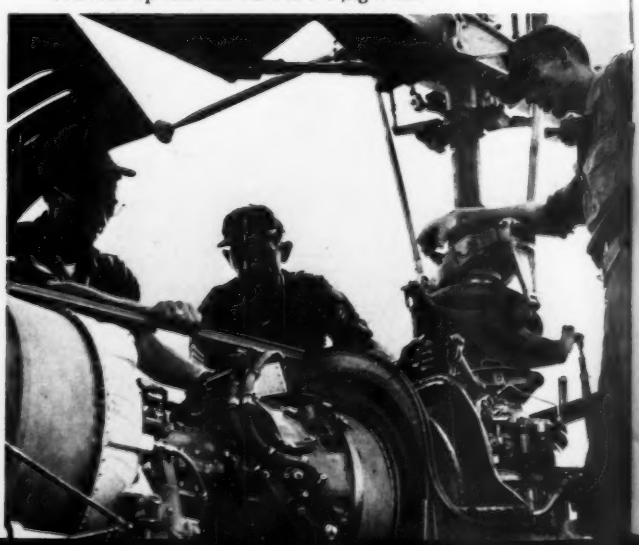
Methods used in Vietnam involve much more than required normally, but after all Vietnam is requiring much more than normal in everything else. In our unit the PE was pulled by the supporting maintenance detachment in its entirety, with the aid only of the crewchief. First the helicopter was completely washed by the organizational maintenance crew and inspected for cleanliness by the crew leader responsible for pulling the PE.

When the helicopter arrived at the maintenance area, all loose equipment was removed and the hydraulic mule attached. Climatic conditions in Vietnam cause undue wear and leaking of the servos and this is the time we rebuild or replace them. The rotor head was removed and everything, including the swash plate, was also removed. The crewchief then drained and flushed the blade grips and trunion bearings while the swash plate and sleeve assembly was checked and lubricated.

During this time the crew leader followed the PE worksheet as listed in the -20 and made the inspections. The sheet metal people inspected the complete airframe for cracks and required repairs. The crewchief having completed the rotor head removed the short shaft and repacked it. The crew leader removed both pilot and copilot doors by the jettison system. The tail rotor and hub assembly was removed and balanced. The drive quill was removed and the complete tail rotor cables checked for broken strands and cleanliness. Before final reassembly the helicopter was completely inspected by the technical inspector.

During reassembly the crew leader corrects discrepancies noted by the tech inspector

TI makes his check, the helicopter is buttoned up and sent back to the flight line



During reassembly the crew leader corrected discrepancies noted by the TI. During the complete course of the PE all discrepancies as noted in the -13 and -14 were corrected; also, any MWOs that can be installed were completed.

The helicopter was then completely buttoned up and moved to the flight line. During the initial start the cowlings were left open to observe for leaks. Before the engine was started the transmission oil line quick disconnect was checked for seating. Also the main fuel line quick disconnect was checked for seating. After initial start a track was made of both tail and main rotors. If main rotor track was less than ½ inch apart a flight was made to determine if vibrations were present. This may be one of the helicopters that had to be taken out of track to fly smooth.

The test flight worksheet, as included in the -20, was used and all necessary recordings made. All in all, the average time to pull this PE including test flight and rearming was 1½ days. Periodic inspections have been known to be done faster, but the little extra time spent we think saved many lives in Vietnam.

A few of the other areas that have caused some problems and a few tips to solutions follow:

Cyclics will be stiff in all directions. This sounds like the magnetic brake problem but a close check will show that the helicopter was probably washed or in a heavy rain recently, and the felt pad under the cyclic friction is wet. The old fashioned heat gun will solve this problem if the time cannot be spared for the sun to do it.

And there are collective sticks with no friction. Again a simple but troublesome problem. Usually the friction brake shoe has come unbonded and must be replaced. Don't completely remove the collective pitch stick. The shoe can be glued back in place and the friction applied to help set the glue. Let it set overnight, if possible, and you are in business again.

In Vietnam it is important that batteries be serviced and checked every three days. In that area a bad battery can cause more electrical problems than one can realize, from hot starts to electrical fires.

The battery relay seems to always fail when away from home station. A quick and easy solution is to use the external power relay as the battery relay and start as normal. Be sure to tape the external relay wires or a serious fire will result. This also calls for a long explanation type writeup in the -13.

The UH-1B is equipped with self-sealing fuel tanks. When a bullet enters the fuel cell at an angle it has a tendency to rip. The self-sealing action cannot normally cope with a rip, so a definite leak occurs. For evacuation the one fuel cell must be sealed off and the helicopter evacuated on the other. If the right tank is leaking it is impossible to fill the left tank; therefore a filler neck is required. Two crossover lines are bolted together at the flanges to form a filler neck. The servo cover in the cabin area is removed and the filler neck inserted to connect to the left tank. The right tank is sealed off at both the cross feed line and the main fuel outlet line. This isolates the right tank. The main fuel outlet line from the left tank must be capped off after the mixing tee to prevent fuel dumping overboard. When starting, the right fuel boost pump circuit breaker is pulled and left inoperative. This may save lots of time in trying to evacuate a one lunged helicopter from an insecure area.

Green tape is a very fine item to be used to cover bullet holes in skin, repair cracked glass, and plexiglass and even holes in glass. Again this is a temporary repair and must be removed and properly repaired when aircraft arrive at home station.

These are only a few of the problems facing mechanics in Vietnam. Everytime a new piece of equipment comes from the States it presents new problems even though it's thoroughly tested and evaluated before being shipped. Mechanics soon learn to correct these troubles and keep their helicopters flying smoothly.

Component replacements are sometimes necessary to correct a deficiency

Whether you fly 4 or 40 hours a month, your flight time in Korea will be a challenge to your professional ability

Lieutenant Albert W. Clemence

IT ALL BEGINS the day you arrive at Kimpo International Airport, Korea. Here, if you are an aviator, you will probably be met by one of the old "Pros" from the aviation unit to which you are assigned, a first lieutenant with nearly 500 hours of flight time.

After exchange of the necessary platitudes, from which you will learn that your fellow aviator has only 279 days left to serve in Korea, you are whisked away to your unit. A scenic 40 minute flight up and down river valleys will thoroughly disorient you and leave you totally unprepared to meet the battalion executive officer, who has come to the airfield to welcome you. Normally you would not be so honored. However, since you are the first replacement aviator to arrive in more than 3 months, everyone in the chain of command is glad to see you.

Following a briefing, during which the more important local regulations are explained, you are shown to your quarters. Ah, home at last.

Now that you have adjusted to the new environment, take a closer look at this home of yours. Since you are here on a category A aviation assignment, you are primarily concerned with the airfield and maintenance facilities. Down by the river is the airfield. It isn't much, but it is the longest unbroken stretch of asphalt in the area—nearly 2,000 feet. Squeezed in among the surrounding mountains, it serves as the landing strip for both fixed and rotary wing aircraft.

Ten feet behind the numbers, which indicate that this strip does, indeed, run north and south as you suspected, is a 6 foot high barbed wire fence. Located behind the fence in the Korean village just off the end of runway 36 are two double-storied cement block buildings. This should present no real problem, but it is something to keep in mind when you return from a mission after dark.

Well, that takes care of the physical installation—no, not quite. Halfway down the strip, about 50 feet to the left of the runway, is a new steel and concrete control tower. That seems a little close but, considering

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everything, this strip isn't as confined as the average training strip at Fort Rucker. Find an IP and get yourself a local area checkout so you can put some of that knowledge you have accumulated in the past 9 months to work.

"Good morning, Lieutenant. I'm Captain Jones, standardization pilot for the battalion. I can see you are anxious to get your local flight check. Ask the operations officer if an O-1A is available this morning and we'll get with the program.

"I'll begin by showing you the limits of our local flying area. As you can see from this map we are located at Tongduchonni, about 40 miles north of Seoul. Our local flying area extends north to the demilitarized zone (DMZ), east to this ridge of mountains, south to this bend in the Han River, and west to the Kimpo Peninsular. You can fly anywhere in this area except along the DMZ on a local flight plan as long as you remain below 2,000 feet."

"Sir, why can't I fly along the DMZ on a local flight plan?"

"I'll explain that later, Lieutenant, when I show you the checkpoints along the DMZ. For the present, make yourself familiar with the limits of the local area. I'll be back in about an hour for your checkride."

"Yes sir."

Well, let me see. This local area shouldn't be difficult to master. It is less than 75 miles wide in any direction. It won't be difficult to orient myself with all of these mountains around. But what about the DMZ? On the other side of that line is North Korea, and the terrain doesn't look a bit different from that in the local area. The map doesn't show any navigation beacons along the line. I wonder how the pilots know exactly where the line begins? I'll have to be certain to get this information from Captain Jones or I could get involved in an international incident.

"Hello, Lieutenant. All ready to go?"

"Yes sir, the O-1 is preflighted and waiting on the ramp."

"Did you check the weather?"

"No sir, I missed that. But there isn't a cloud in the sky. Looks OK to me."

"That's where you are wrong, Lieutenant. We are located less than 40 miles from the Yellow Sea. Any pressure system developing out there can pump weather in here faster than you can file an IFR flight plan. You probably noticed that there are no navigation beacons in the local area. Furthermore, Eighth Army regulations restrict IFR flight in the tactical zone.

"Clear and seven. The Air Force agrees with your prognostication, Lieutenant, so let's get with it."

"That was a good crosswind takeoff. Climb to 2,000 feet and head for that valley to the southwest."

"Yes sir."

"You arrived at the best time of the year. Do you see all of those yellow squares down there? They are rice paddies, and the rice is about ready for harvesting. South Korea has about 28 million people and rice keeps most of them from going hungry. You won't find much wasted land here. Rice is grown everywhere the ground is level enough to hold water. The average rice paddy is about 200 feet long and 50 feet wide. Each paddy is surrounded by mud dikes 18 to 36 inches high and is full of water during the growing season.

"Pardon the history lesson, Lieutenant, but at this time of the year, with the rice fully grown, it is difficult to see the mud dikes around the paddies. I didn't want you to think that this entire valley was just one big forced landing area."

"With all of these mountains around and the valleys full of rice paddies, where can a fellow make a safe forced landing?"

"That's a good question. Of course it depends upon the situa-

The terrain offers little in the way of forced landing areas

tion, but generally stream beds are the best; roads next; and finally, if you can find one large enough, rice paddies. Make a high reconnaissance of that strip off to the right and we'll go down and make a couple of power approaches."

"Yes sir."

"The strip runs generally north/south. It is about 1,800 feet long and 50 feet wide. The surface is dirt and there are no significant barriers, except that ridgeline coming in from the north. The wind is out of the northwest at about 12 knots."

"I'll make a right-hand traffic and land to the north."

"Good reconnaissance. This strip is similar to most of the strips in this area. Operated and maintained by the Republic of Korea Army, the only services available here are friendship, chocks, and tiedowns. That was a good approach. Now let's head north and check out the DMZ.

"All flights into the demilitarized zone require approval from Eighth Army. Since the entire area is under radar surveillance, it is necessary to make a radio check with air traffic control when entering and leaving the surveillance zone and at any time during the flight when you reverse your direction. The surveillance zone in our area is outlined by 16 checkpoints. These checkpoints are located on prominent terrain features at the major turning points along the route of flight. There are no navigation beacons along this 80 mile section of no man's land. You will have to rely on pilotage to keep yourself oriented.

"The DMZ varies in width but averages about 3 miles across in most areas. It consists of three sections: a north boundary, a center line, and a south boundary. This strip of land is unused by either North Korea or the Republic of Korea. We are not allowed to cross the southern boundary without special permission. Our surveillance flights are all conducted within 1,000 meters of the south boundary. Direction of flight along the DMZ changes as much as 60° from one checkpoint to another, so it's important to check your map frequently."

"Sir, if the other side of that river is in North Korea, why is that bridge still there?"

"That's Freedom Bridge. The road crossing it goes to the United Nations Joint Security Area and Panmunjom. There is always a guard on the bridge and I wouldn't be surprised if there were demolition charges already in place on the pilings. That's about all there is to it, Lieutenant, but you'll get a couple of rides up here before we let you take a surveillance mission."

"Yongsan control, this is surveillance zone observer, departing the DMZ at 45. Out."

"Fly down that valley to the south and we'll head for home. That was a good flight, Lieutenant. The 30 days of leave you took before coming to Korea didn't affect your proficiency. Close out our flight plan and I'll see you at the club."

Army and Air Force Specify

Aircraft Responsibilities

THE CHIEF OF Staff, United States Army, and the Chief of Staff, United States Air Force, announced their joint decision regarding the responsibilities of their respective services for the control and employment of certain types of fixed and rotary wing aircraft.

Army CV-2 (Caribou) and CV-7 (Buffalo) aircraft will be transferred to the Air Force, and the Air Force will be responsible for all future intratheater fixed-wing tactical airlift. Other type fixed wing aircraft are not affected.

The Army will be responsible for all rotary wing support for intratheater movement, fire support, supply and resupply of Army forces and those Air Force elements working with Army units to coordinate air support. The Air Force will retain responsibility for rotary wing aircraft involved in Air Force search and rescue and special air warfare missions and Air Force rotary wing administrative support missions.

In cases of operational need the joint or unified commander is authorized to attach the CV-2, CV-7, and C-123 type aircraft to Army corps, division or subordinate units in the field to perform supply, resupply, or troop lift functions.

The two services will continue to consult on the design of follow-on fixed wing aircraft to assure that takeoff, landing and load-carrying characteristics meet the needs of the Army for supply, resupply, and troop movement functions.

Actions required by this agreement will be completed by 1 January 1967.

The Perfect Flight -- almost

No flight is over until the engines are shut down and the airplane tied down

IT'S THE KIND of day that delights aviators. The sky is clear and the air still crisp even though it's early spring. The few warm southern breezes that have broken through winter's cold grip have only managed to cause the buds of some hardy trees to swell a little and nothing more.

Inside the warm cockpit of the Mohawk, the instructor and student buckle their seat belts and proceed through their checklist—auto feather switch on, speed break switch in, hatches closed, and on and on. When they get

clearance to take off they turn on the anticollision light switch.

The airplane rolls slowly onto the field and the instructor aligns it with the runway. After stabilizing the power levers, he releases the brakes, advances the power and starts his run.

Below, the ground moves faster and faster. Very quickly it slips away and seems to slow down in its mad rush backward. Trees and buildings get smaller and smaller until they look like toys. Then they merge into a sea of gray fur with occasional blobs of dark greens from pine trees and almost black blues from farm lakes.

Aloft the wind seems to come in waves jolting and buffeting the airplane as it rises in the air. But the instructor holds its nose upward and soon even this minor disturbance disappears. At 9,000 feet the air is very calm and the instructor levels off.

Now it's the student's turn to take over. He gets the feel of the aircraft by straight and level flying, climbs, glides, and turns. He gains confidence in his ability to handle the bird by flying slow, and practicing stalls. And then he does his coordination exercises—banks with and banks without turns.

When the lesson for the day is over they head back to the field. Everything has been perfect. The weather has continued good, the airplane never once faltered, and the student shows he is ready for advanced work.

The instructor starts his approach—external stores panel switches off, armament circuit breakers out, camera controls off, landing gear down and checked, flaps down, and shoulder harness locked.

In keeping with the perfect day, a perfect landing is made. Turning the airplane around, the instructor starts his taxi back to tiedown. He hands the student the Aircraft Flight Log (DA Form 2408) and tells him to fill it out. But like a good instructor he keeps an eye on the student and sees that he is filling it out wrong. Taking the log from him he tells the student "You have it" and proceeds to fill out the log himself. He doesn't notice that there is no answer from the student.

Engrossed with the job of filling out the form he is only slightly aware of his airplane and student. The drone of the engines seems far off in the distance. He does not notice that the student is watching him instead of where the airplane is going.

Suddenly the student looks up, yells something and applies the brakes. The instructor instantly becomes alert. He sees that one wing of the Mohawk is only 5 feet from another airplane and that the other is just about ready to strike a ½ ton pickup. He instantly feathers the props, but it is too late. With a resounding crash the Mohawk hits both of them. It was a perfect flight—up to a point. But no flight is over until the engines are shut down, the after landing checks made and the airplane tied down. Then and only then can the Aircraft Flight Log be filled out.

With a resounding crash the Mohawk hit the pickup truck and the airplane. It was a perfect flight—up to a point.

Full Speed Ahead

Gilbert J. Till

Now in the Pacific underway for Southeast Asia the *USNS Corpus Christi Bay*, floating aircraft maintenance facility, is a bold new Army maintenance concept. The conversion of this ship (originally named the *USNS Albemarle*) for direct or general support of Army aircraft and equipment and its planned operation was reported in the April 1965 DIGEST article "Project Flattop."

This photo story covers the Avionics Repair Complex, which is one of the aircraft maintenance support facilities aboard ship.

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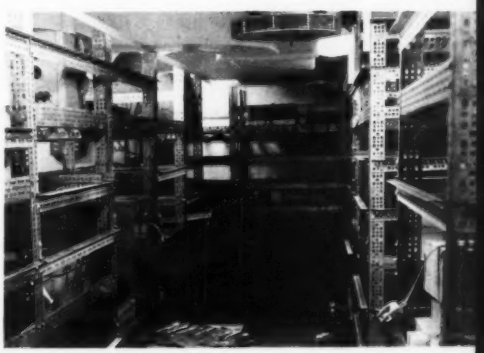
AFTER FIFTEEN months of grueling work and the burning of many gallons of "midnight oil" by various Army commands, Project FLATTOP has provided the Army with a floating aircraft maintenance facility now ready for deployment anywhere in the world.

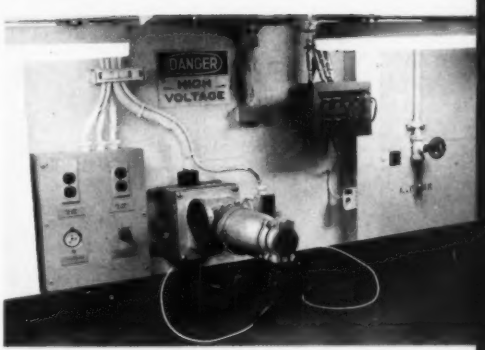
The Avionics Repair Complex, with shops in the superstructure and on the main deck, represents a "first" in floating avionics repair facilities by the U. S. Army Electronics Command.

This maintenance ship has a repair and overhaul capability for aircraft components and instruments. Supporting shop facilities provide multipurpose engine test cells, transmission load run test stands, calibration, electrical, hydraulic machine shops, etc., to include nondestructive tests and metallurgical and a chemical laboratory.

Test equipment, power requirements, antenna patch panel, stowage racks, and spare-parts bins of this complex were specifically compiled around avionics maintenance requirements for the following aircraft: UH-1B, D; O-1A, E, F; U-6; U-1A; OH-13E, G; CV-2; OV-1; U-8F; CH-47; OH-23D, G.

This floating aircraft facility will provide the Army with an aircraft maintenance capability to straddle the pipeline of repairable items normally requiring return to CONUS shops. Not only will this speed up return of repaired items to the user, but it will also help lower maintenance costs.





Upper right: Stowage racks. Note tiedown straps and circular air-conditioning outlet overhead. Right: Each bench area has a power panel, antenna patch panel, low pressure air and grounding cables. Below: Test equipment being readied (note insulated bench).

Knowing the contents of the first aid kit in your aircraft could save your life. Check it out frequently.

Captain Jefferson T. Boulware, Jr.
Department of Tactics, USAAVNS

THE DAY BEGAN as a normal one in the life of 2/Lt James Monroe Merritt, a student going through the fixed wing flight program at Fort Rucker. He had been awakened at 0430 by the clanging of his alarm clock, which he heartily disliked after two months in flight training.

Giving the wife a gentle nudge to get her motivated in the direction of the kitchen, Merritt was off to the bathroom for his morning shower and shave. Then he went to the kitchen to try to stuff down the calories required by the flight surgeon. Upon smelling the burned bacon grease, he almost gagged. However, he knew it must be eaten as the long day would require every calorie of energy. Little did he know at this time how long the day really would be.

After breakfast there was the usual honk of the horn to signify the riders were waiting. After joining his car pool he rode to the student company and boarded the bus for Lowe Field. As Merritt entered the building at Lowe, he gave a last glance over his shoulder to see if maybe he hadn't missed a cloud in the sky. It looked as if today would be "all go."

He was greeted by the flight instructor. Then came the morning briefing by the flight commander, and afterwards the assigning of aircraft for the morning flight. For Lieutenant Merritt, today was his day for all solo, a day to practice and work out some of those problem areas pointed out the previous day by his instructor, except this time with a little more "at ease" on the nerves.

Picking up his parachute he proceeded out to row E to find his airplane. After a thorough preflight, runup, and taxi out, Merritt was ready to begin his flight day. Over the radio came the awaiting message, "Army 1313 cleared for takeoff 24. Over." After a brief roger, Army 1313 rolled down the runway. It was a normal takeoff, pattern break, and then westward to the training area.

After crossing the Pea River, Lieutenant Merritt started his first maneuver—spiral around a point. After spiraling down to 800 feet, he started his steep eights around pylons. Noticing that over 30 minutes had passed, Merritt reached back and changed his fuel selector valve. However, this time he didn't get that feeling of the ball sliding into the slot. Immediately he switched back to the original tank. Again, he didn't find the position. Fear began to chill his body as he frantically tried to select a tank. Working the selector valve and flying the airplane kept both hands busy.

The Bird Dog began to cough. Realizing the crash was coming, Lieutenant Merritt made a desperate call just before impact into the trees. Little did he realize he had pressed the intercom button. Impact was short and without remembrance as Merritt crawled out of the demolished plane.

Examining himself he found all parts intact, but he had numerous cuts and bruises. One he noticed in particular as he began to feel severe pain in his right leg. Upon further inspection under the flight suit he found a severe cut in his thigh. Bright red blood pumped out with each beat of his heart. Sweat poured off his brow as he thought of what might follow.

Realizing that something must be done to stop the bleeding, Lieutenant Merritt tried to remember some of the first aid training he had received at summer camp while attending military school. Immediately he thought of a tourniquet and started looking for material to make one. The only thing available was his boot lace. After taking it out of his boot, he applied it just above the wound, using a stick to apply pressure. The boot lace was painful as it exerted its pressure and broke into the skin. But the bleeding slowed and below the tourniquet the pulse dropped.

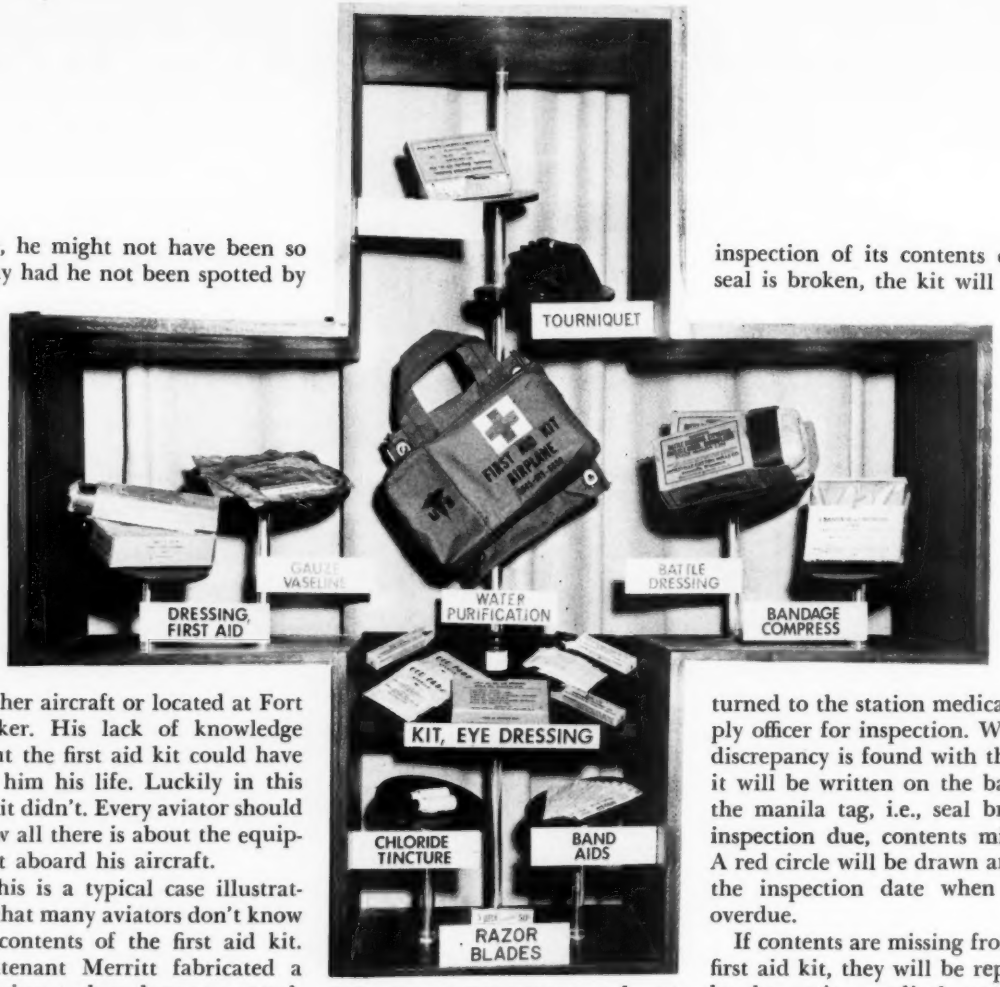
Now his attention turned to the first aid kit to see what was there that he could use. Long had he flown with first aid kits in those Bird Dogs but never had anyone informed him of the contents. To him it was an item to check during the preflight and write up on the -13 if missing, but never to tinker with in any manner. During these two months he had developed an attitude of hands off to that little kit on the left wall. Now he was having to break the seal. It seemed as if he were breaking some rule.

First he opened the outside flap. Out fell a box of Band Aids, a bottle of water purification tablets, and two bottles of benzalknoium chloride tincture. Often before he had needed a Band Aid and never knew they were there. Now he broke the seal and pulled back on the zipper. The kit opened into two halves. There before him was an assortment of first aid dressings, a bandage, an eye dressing kit, a box of ammonia ampules, a package of petrolatum gauze, a box of razor blades, and, to his surprise, a tourniquet.

Immediately he began to apply one of the medium dressings over the gash to help stop the bleeding and protect the injury. And then followed the task of taking care of some of the minor cuts.

Luckily for Lieutenant Merritt, another aircraft had spotted him as he disappeared into the trees and had notified Lowe. By this time Flatiron was arriving on the scene and rescue was in progress. Forty-five minutes from the time of crash, Lieutenant Merritt was at the Fort Rucker hospital. How-

ever, he might not have been so lucky had he not been spotted by another aircraft or located at Fort Rucker. His lack of knowledge about the first aid kit could have cost him his life. Luckily in this case it didn't. Every aviator should know all there is about the equipment aboard his aircraft.



This is a typical case illustrating that many aviators don't know the contents of the first aid kit. Lieutenant Merritt fabricated a tourniquet when there was actually one available. Let's hope that each aviator will know the contents of the kit after reading this article.

Students going through flight training are taught about the first aid kit during Tactics training. However, this instruction does not come until he has almost completed "B" phase. Is this early enough?

The first aid kit, airplane is governed by TB AVN 10, dated 19 May 1965. All essential information, except for content, can be found in this bulletin. To begin with, every aircraft is authorized first aid kits based on one per crew compartment and one per five personnel or any fraction thereof. The outer canvas cover will have a red cross on a white background and the words "First Aid Kit, Airplane."

The main compartment of the kit will be sealed with a lead seal bearing the identification MED on one side. Also attached to the seal will be a manila tag. (Refer to TB 10 for exact details.) Both will be prepared by the station medical supply officer.

The kit will be inspected at each daily inspection to ensure that the seal is not broken and that a manila tag is attached. If 1 year has elapsed since the last inspection of its contents or the seal is broken, the kit will be returned to the station medical supply officer for inspection. When a discrepancy is found with the kit, it will be written on the back of the manila tag, i.e., seal broken, inspection due, contents missing. A red circle will be drawn around the inspection date when it is overdue.

If contents are missing from the first aid kit, they will be replaced by the station medical supply officer. Components should be requisitioned in accordance with AR 725-50 (MILSTRIP). Federal Supply Catalog C 6545-1L, Vol 2 lists the components of this kit.

The first aid kit, airplane is a small item aboard your aircraft. But remember one thing, it is the only equipment available for the aviator to provide first aid to himself or the passengers aboard his aircraft. A knowledge of the content of this kit should make you rest easier as you fly your aircraft. If nothing else, it will prevent you from breaking the seal when looking for an item not found in the kit.

High rates of attrition in pilot training continue to challenge personnel management

Identifying Successful Pilots Through Research

Dr. Arthur J. Drucker
and
Mr. Harry Kaplan

Dr. Drucker and Mr. Kaplan are members of the U. S. Army Personnel Research Office, Washington, D. C.

VOLUNTEERS for Army Aviation pilot courses will soon be taking a new set of tests to determine their aptitude for such training. The new Flight Aptitude Selection Tests (FAST) will be available in two batteries: a FAST officer battery and a FAST warrant officer candidate battery. Each applicant will get a rotary wing aptitude score, a fixed wing aptitude score, and in addition will be required to meet minimum qualifying standards on the basis of his composite score.

The FAST batteries represent the latest step in a continuing effort to identify successful pilots through research.

Selecting trainees for Army Aviation pilot courses has severely challenged personnel management since the formation of the Air Force as

a separate service in 1947. The principal headache has been a familiar one—high rates of training attrition. Although the ailment was first noted among Army fixed wing pilot trainees, it plagued rotary wing aviation training even more.

When the Army first began to develop its own aircraft organization, selection of personnel to be trained as Army Aviators posed no special problem. Many officers and warrant officers trained as pilots in the U. S. Army Air Corps had remained in the Army as aviators after formation of the Air Force. But this supply of qualified manpower eventually was exhausted and it became necessary to train men who had no previous flying experience.

Most would-be helicopter pilots entered aviation training as enlisted men and received appointments as warrant officers upon completion of the Warrant Officer Rotary Wing Aviator Course. However, the need for these warrant officers to be leaders as well as pilots was soon evident, and many of the trainees did not meet the needs of the service for leadership. The training program was therefore expanded to include intensive training of the type given in Officer Candidate School.

This double hurdle of leader-pilot prerequisites was one many applicants could not negotiate. Unfortunately, their failure could not be readily predicted and became apparent only after training had started. Eliminations during training were expensive to the Army—wasted travel, wasted flight instruction, and loss of duty time.

Improved screening was indicated. Research was initiated by the U. S. Army Personnel Research Office at the request of the Deputy Chief of Staff for Personnel. From the start of the program in 1955, selection for rotary wing pilot training received the major attention, although both fixed wing and rotary wing test batteries were developed and made operational to meet later as well as original requirements in the Army's aviation program. The two batteries were integrated into a comprehensive program in 1963.

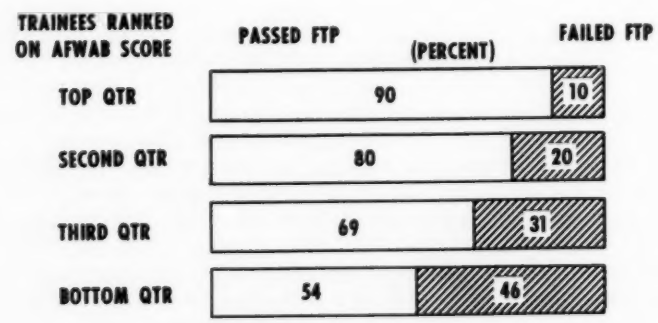
The Air Force had done exhaustive research on fixed wing pilot selection. To take full advantage of the Air Force products, initial research on fixed wing selection was limited to modification and adaptation of Air Force instruments and follow-up studies to determine their effectiveness in selecting for Army pilot training. The first such battery, AFWAB-1, was in fact based on Air Force tests. It included background inventory, aeronautical information, mechanical principles, aircraft orientation, and flight visualization. These tests were selected after tryout and evaluation on 1,109 students and Army research demonstrated their effectiveness in discriminating between successful and unsuccessful flight training program (FTP) trainees.

A parallel study was next conducted for selecting students applying for Army ROTC flight training. AFWAB-1 was administered to 1,245 applicants for the program from 1956 through 1959. Men were tested in ROTC summer camp following their junior year and before entrance into flight training.

Results indicated that AFWAB-1 could be a fairly effective instrument in reducing attrition in both training programs. Of those scoring in the top quarter on the battery, only 10 percent failed flight training. By contrast, fully 46 percent of those in the bottom quarter failed flight training. In general, the higher the battery score, the greater the likelihood of success in flight training.

In the Army's rotary wing research effort, also conducted by APRO, again the first approach was to try out existing batteries of the other services—this time Navy as well as Air Force. Because of the officer-candidate type of training that had been added to prepare enlisted trainees for appointment as warrant officer pilots, screening measures were needed which would select men who could successfully complete both types of training.

A long range research program was initiated for development and identification of more effective predictor measures. Some tests were developed specifically for the program; others were assembled from related programs. The total effort involved dozens of tests and experimentation with thousands of trainees. Over 40 tests in all appeared promising enough to be



Comparative success in Army primary FTP of 1109 trainees

incorporated into experimental batteries. Measures of flying proficiency and measures of academic achievement and leadership performance were obtained as bases for evaluating the predictors. Different aspects were measured for different phases of the research, but concentration was on preflight (the OCS-type training), primary flight training, and total performance in training.

Interim Operational Rotary Wing Batteries

Concurrently with this long range effort, APRO undertook a number of research studies to satisfy immediate operational needs on an interim basis. Between 1955 and 1961, three interim batteries to help select helicopter pilot trainees were successively implemented. Much of what was learned from the long term effort in progress was applied in the operational situation.

As more research evidence accumulated, it became evident that a broader range of abilities had to be tapped if predictive effectiveness was to be substantially improved. The third interim battery (ARWAB-1), implemented in October 1961, proved to be fairly effective; hence, it was decided to use it until all aspects of the total long range research effort could be completed. It consisted of the OCS board interviews, the OCS evaluation report, the locations test, the complex movements test, the helicopter pilot self-description form, and the helicopter information test.

Results by Type of Predictor

In the hypothesis stage of research, management and science frequently pool ideas. For rotary wing research, psychological measurements based upon tests, and measurements based upon administrative factors were obtained experimentally.

Background. Age, education, rank, and previous flying experience were nontest data analyzed in relation to passing or failing the training course, as well as in relation to specific aspects of the training program. Knowledge of these relationships could be a useful basis for administrative decision on establishment of nontest prerequisites for admission to training, such as accepting only those with 12th grade education, or only those with previous flying experience.

Photos show the student aviator in representative phases of training—academic, "hangar flying," aircraft and cockpit familiarization

Students who successfully completed the course were younger, better educated, lower in rank, and had more previous flying experience than the average. But all differences were slight and did not add up to a degree of prediction that could safely be recommended for use by military management.

Personality Measures. Four types of personality and motivational measures were tried out: psychiatric evaluation, evaluation by supervisors, board interview procedures, and self-description instruments. Since motivation and adjustment were judged to be of paramount importance, much of APRO's effort went into development of the self-description measures.

The most effective single test for predicting overall success in training was in fact a self-description instrument which incorporated the most effective content from four different tests upon which considerable previous experimentation had been conducted. Results with this test furnished empirical evidence that success in training for Army Aviation requires a variety of attributes—motivation, personal adjustment, leadership attributes, as well as flying skills.

Psychomotor Tests. Because a pilot engages in a considerable amount of eye-hand-foot coordination, apparatus tests which measure psychomotor abilities were included in the tryouts. Four Air Force tests were tried out, even though management and research personnel alike were aware they would entail expense and administrative difficulty in operational use. It was found that a combination of tests which included psychomotor measures would be somewhat more effective than the best combination of paper and pencil tests alone in reducing attrition due to flying deficiency. However, the advantage did not hold when it was a question of reducing overall attrition. Under peacetime conditions, therefore, use of psychomotor tests does not appear to be justified either by technical or by practical considerations. (A mobilization battery might profitably include such tests.)

Cognitive Tests. The General Technical Aptitude Area (GT), a composite of the verbal and arithmetic reasoning tests of the Army Classification Battery, was a good predictor of academic grade in the training course. However, scores bore no relationship to overall success in training. Apparently the careful screening on general ability the trainees have had before being assigned to the aviation training course already wipes out any differential. Failure rates for academic reasons are therefore quite low, and the bulk of the attrition must be laid to other factors—among them a lack or low level of the special aptitudes needed.

Cognitive, or *can-do,* tests were tailor-made for the most part to tap six psychological domains or content areas: spatial, mechanical visual perception, eye-hand coordination, situational reasoning and aviation information. The batteries recommended for operational use include tests in the three most effective areas: spatial, mechanical, and aviation information. Findings in this respect were consistent with those of the other services.

The FAST batteries represent an integration of the two separate lines of research. Each applicant can be selected to be evaluated for a specific training course on the basis of his aptitudes in contrast to previous operational procedures.

In 1963, when the Deputy Chief of Staff for Personnel directed an integrated system of aviation selection, the Army had in operation valid procedures for selecting enlisted men to be trained as warrant officer helicopter pilots, as well as valid procedures for selecting officers to be trained as fixed wing aviators. For a comprehensive program, it was necessary to add procedures which would permit valid selection of enlisted men for fixed wing training and which would also permit valid selection of officers for rotary wing training.

The accumulated body of research findings on pilot trainee selection afforded an adequate basis for constituting a comprehensive program without extensive additional research. Batteries making up the FAST were assembled on the basis of flight training data and data collected on the job for pilots assigned in selected locales both in the continental United States and overseas.

Effective selectors for enlisted fixed wing training and for officer rotary wing training are introduced for the first time. In addition, FAST batteries are more effective for selecting enlisted applicants than is the previous operational rotary wing battery, particularly with respect to flight performance.

Controlling the Quality of FAST Batteries

Once the Flight Aptitude Selection Tests become operational, a new cycle of research will begin. Effectiveness of the tests will be evaluated on a continuing basis through follow-up research. The U. S. Army Personnel Research Office will obtain completed test answer sheets of applicants, as well as information on the performance of students in training. Statistical analysis will be performed which will provide a sound research basis for recommending changes whenever such changes become necessary.

He pictured himself in the White House, flashbulbs popping...

AN EXPLOSION OF profanity roared from a speaker in the tower console. "Get that #\#**!! idiot out of this cockpit before I shoot him!" Both operators jumped to their feet. Mouths open, they stared across the field.

A MAC 707 on final was the only aircraft in the pattern. Gear and flaps extended, it trailed four plumes of smoke. They watched it pitch up, shake violently, and drop a wing. The smoke plumes darkened and the thunder of four jet engines at full power rumbled past the tower as the 707 recovered and climbed, tucking its gear.

"Tower, this is MAC 434 going around."

"Roger, 434. Are you in trouble?"

"Negative, tower. One of our passengers sneaked on the flight deck and insisted on helping the captain with his approach. The engineer has him pinned in his seat. Request landing clearance. Over."

"You're cleared number one, 434. Wind north at ten. Altimeter two, niner, niner, six." The tower operators watched the huge jet make a wide pattern, approach, and land. It taxied slowly up to the ramp and the alert crew rolled step stands to its doors as the jets whined to a stop.

An angry pilot emerged, shaking his fist under the nose of a tall captain with a wide smile splitting his suntanned face. "Frozzleforth, I'd prefer charges against you if it wouldn't delay our outbound flight! What gave you the idea you could come in my cockpit and tell me how to fly? Do you know you almost caused me to clobber?"

"Tut, tut, Captain Ferris, you mustn't let your anger get the best of you. Bad for your digestion, you know. I must say your second approach was much better. Held your attitude and airspeed admirably . . . most admirably. We did bounce a bit at touchdown, though. I believe you could correct that if you'd round out sooner and hold it off a trifle longer. Don't you agree?"

The 707 pilot's face blossomed into a flaming red. A vein stood out on his forehead as his fist pounded the stairway railing. He drew a deep breath and pointed down the steps. "Out! Out, damn you, out!"

Horatio Frozzleforth saluted the trembling pilot and trotted down the steps. "Ungrateful type, I must say! You'd think he'd jump at the chance to improve his flying. Ah well, mustn't let him disturb me. I've far more important matters to think about. Wonder if they'll want me as an advisor to the general's staff?" He stopped on the ramp and his eyes moved over the crowded airfield and back to the bomb scarred terminal. "So this is Saigon."

* * *

Far to the north, an exhausted major stepped through a tent flap, dropped his helmet and flak vest on a foot locker, and sank to a blanket covered cot. "Any news from headquarters?" he asked a soldier manning the CP radio and telephone.

"Yes, sir. We have a replacement pilot coming in tomorrow."

"Good! Who is he?"

"Captain Horatio Frozzleforth, sir."

The major shot from the cot and gripped the

FROZZLEFORTH

soldier by both arms. "You've got to be kidding! They wouldn't dare! Who put you up to this? Who?"

"I'm s's'sorry, sir. That's the name they gave me. It's written down on the log." He rubbed his arms as the major released him and grabbed up the log. "It came straight from headquarters."

The major's eyes searched the log sheet and stopped at a 1600 entry: "Captain Horatio Frozzleforth —dual rated senior aviator—will report for duty as replacement pilot at 0900, 21 January 1966." He looked away, hoping the name would erase itself and disappear.

The field telephone jingled and the soldier answered. "Company A command post. PFC Ranklin, sir." He looked up at the major, "Yes, sir. He's here."

He passed the phone to the major. "For you, sir—batttalion headquarters."

"Major Clark."

"Colonel Lightfoot, Phil. I just got the order for an all out effort tomorrow. Can you get all your Hueys up.

"I think so. But we're short of a pilot."

"Don't you have a replacement coming in the morning?"

"Yes, sir. Do you know *who* it is?"

"I'm sorry, Phil. We had to put him somewhere and you had the opening. You'll just have to keep your eye on him and hope for the best. Get your chart and take down these coordinates."

• • •

"Captain Frozzleforth reporting for duty, sir!"

Major Clark looked up from his folding table and returned the tall aviator's salute. His eyes took in the freshly starched and neatly creased fatigues, the mirror like shine on the new combat boots, and the handsomely tanned face. "Frozzleforth, I've heard of your shenanigans in every unit I've served with! Now I'm stuck with you!" His fist hammered the table. "By all that's holy, if you pull one of your tricks and bend one of our helicopters, I'll slice you up and feed you to the Viet Cong piece by piece! Understand?"

"Have no fear, sir, I'm here to lend my assistance wherever it's needed."

"No, Frozzleforth! You're *not* here to lend your assistance! You're here to fly a Huey where I tell you to fly it—and back in one piece! Is that clear?"

"Perfectly clear, sir. Will you be needing me today? If not, I thought I'd take a short hop and get familiar with . . . "

"Get your gear and report back here on the double for a mission briefing in 5 minutes!"

"Five minutes, sir? I haven't unpacked and . . . "

"Frozzleforth!!" Major Clark rose to his full height and pointed to the tent flap. "Out!"

Frozzleforth opened his mouth, closed it, saluted, about faced, and hurried from the CP tent. "Major seems upset . . . Must be suffering from battle fatigue . . . Guess I'd best humor him . . . Just wait until he sees how I can handle a UH-1!"

• • •

Major Clark finished his briefing before the group of pilots, crewchiefs, and gunners. "If this goes off as planned, our troops stand a good chance of bottling up a major force of Viet Cong. Any questions? If not, let's get on with it!"

As Frozzleforth followed the crews out to the dispersed helicopters, two crewmen trotted up to him.

"Captain Frozzleforth? I'm Carter, your copilot, and this is Specialist Malingo, your crewchief.

You're lucky, sir. Major Clark assigned you one of our newest ships. It's the one he's been flying."

"Glad to hear it, Carter. I like to fly good equipment. It's better suited to my ability!"

As the UH-1s lifted off and assembled, Frozzleforth dropped into trail position behind Major Clark's lead ship. They took off over the trees, flew over a jungle area, and landed in a clearing at the base of the mountains. Troops broke from the trees at the edge of the clearing and ran through the grass to the waiting helicopters. They boarded quickly and the formation took off again, flying low over the trees to the north.

Carter nudged Frozzleforth and pointed down. He looked and saw flashes of ground fire.

"Ah, this is where I show my mettle!" Frozzleforth dropped lower and began to porpoise, changing his pitch attitude rapidly. He rolled from side to side.

Startled, Carter stared at the smiling pilot. "Sir, we're dropping behind." He watched the other helicopters pass them and close on the lead ship. "Major Clark's leaving us, sir!"

"No sweat, Carter!" Frozzleforth continued to maneuver. "Never give the enemy a clear shot. That's my motto!" He hauled back on the cyclic and cleared a tall tree by inches. "Keep 'em guessing!"

Carter pulled his eyes from the trees and looked back into the cabin. Malingo and the eight troops were gripping their weapons and seats, staring out with wide frightened eyes as the treetops whipped past. He turned and searched for the formation. It was out of sight. "Captain, I can't see the formation!"

"Bound to be just ahead of us. Relax! Frozzleforth is here!" He hauled back to clear another tree. There was a loud snap from the rear and the helicopter swung to the right. He shoved his foot against the left pedal, but they continued turning. As the helicopter streamlined, the turn stopped. He gripped the cyclic and collective, a frown replacing his smile. "Carter, I'm afraid we've lost our tail rotor."

"Yes, sir. It hit that tree! Can you hold it?'

"I think so, but we'd better start looking for a place to put down. We shouldn't be far from the landing zone."

"There's a clearing up ahead!"

Frozzleforth dropped in over the trees and flared. The UH-1 touched on the rear of its left skid, bounced forward, collapsing the skids, and rolled on its left side. The main rotor blades disintegrated as they chewed into the turf. There was a grating noise from the transmission, then silence.

"Captain, are you all right?"

"I think so, Carter. You?" Dazed, Frozzleforth climbed from the wreckage and watched the crewchief and troops spill out and run for the woods. There was a sharp crack of rifle fire and a bullet pinged through the fuselage beside him.

"We'd better get out of here, sir! Keep your head down and follow me!"

Frozzleforth ducked low and ran behind the copilot. They reached the trees and dived into the underbrush, rolling for cover. A hail of bullets slapped the leaves and buzzed over their heads.

"Cripes! We must have landed right in the middle of them! Let's get out of here!" Carter began to crawl deeper into the trees.

"What about Malingo and the troops?"

"They made it to the trees on the other side. We can't help them from here!"

FROZZLEFORTH

Frozzleforth crawled behind the trunk of a large tree and sat up. "Hadn't we better try to link up with our troops?"

"Yes, sir. But how do we tell where they are?"

Frozzleforth pointed to the right. "You circle through the trees in that direction and I'll go the other way. If you link up, come after me and I'll do the same for you."

"Yes, sir. Good luck." Carter stood and walked away.

Frozzleforth stood and watched the copilot disappear into the woods. He turned left and began to creep forward, guiding himself by the sporadic firing from the clearing. He drew his .45, thumbed off the safety, and pointed it ahead as he parted the vines and stumbled through the undergrowth.

A pair of legs projecting from under a bush caught his eye as he stopped and wiped the sweat from his face with his sleeve. Quickly, he slipped behind a tree and peered at the bush. His eyes focused on the darkness under the bush and he saw a soldier in fatigues stretched prone, his rifle pointing toward the clearing, and his helmet camouflaged with branches and leaves. He was about to step out when the soldier turned his head and Frozzlefroth saw his face. It was oriental. "Ah," he thought, "VC!"

Frozzleforth stared around, moved from behind the tree, and tiptoed up behind the prone soldier. He knelt beside him, then dived forward and drove the muzzle of his .45 into the exposed back. His left arm circled his victim and his hand clamped over the other man's mouth.

The soldier struggled furiously, then went limp as the .45 muzzle jabbed deeper into his back. He stared around at the big American and his eyes widened. He shook his head from side to side, attempting to speak. Frozzleforth quickly gagged him with his handkerchief, removed his belt, and bound his arms behind his back. He prodded and jerked him erect, then motioned him forward. Twenty yards farther, he spotted another prone soldier and repeated the process.

Frozzleforth continued through the trees around the perimeter of the clearing, collecting prisoners. "Shades of Sergeant York," he thought, "give me enough time and I'll capture their whole blasted outfit! It's a good thing that tail rotor failed when it did. This will get me a DSC, a least." He pictured himself in the White House, flashbulbs popping, as he stepped back smartly and snapped a salute. "Thank you, Mr. President!"

An artillery round exploded in the woods ahead and snapped his mind back to the present. He motioned his prisoners down and dropped beside them. A barrage thundered through the trees and shook the ground. Between the explosions, he heard the rattle of machinegun fire and the sharp crack of rifles.

As the smoke and dust cleared, Frozzleforth saw crouched figures dashing from tree to tree toward his position. They drew nearer and he saw they were American troops. He stood and waved them to him. "This way, gents!"

A sergeant was the first to reach him. "What the . . . !" He stared at the gagged and bound prisoners, then back to their captor. "Where did you come from?"

"Captain Horatio Frozzleforth, sergeant! My helicopter had *materiel failure* of the tail rotor on the way here. Fortunately, through great skill, I was able to land it with no injuries to my crew and passengers. We deployed to seek help and I found myself in the midst of a strong Viet Cong position. Naturally, I proceeded to capture them!"

The sergeant stared from Frozzleforth to his prisoners and back. He motioned for one of his soldiers. "McKenzie, you'd better get the captain. He's got to see this to believe it!"

The soldier trotted back through the trees and returned with an infantry officer. The officer stopped short and stared at the neat row of bound and gagged prisoners. "Who's responsible for this?"

"Captain Frozzleforth, sir," answered the sergeant. "I knew you wouldn't believe it!"

The officer glared at Frozzleforth. "You did this?"

"Always glad to lend a hand, Captain. Hadn't you better get these prisoners under guard?"

"These *prisoners,* Captain Frozzleforth, happen to be soldiers of the Republic of Vietnam! They were in position to stop the VC during our attack! Thanks to you, the enemy has escaped!" He shook his fist under the tall aviator's nose and whirled around. "Sergeant, release those men! Get word to the battalion commander! Tell him our trap was sprung by this idiot! Find out if he wants a firing squad! Tell him we'll volunteer!"

* * *

Shining in the ramp lights under a patter of rain, the MAC 707 waited for its passengers to board. In the dim light of the cockpit, the pilot glanced toward the terminal and saw a tall figure walking toward the plane. "Oh, no, it can't be"

"Can't be what?" asked the copilot.

Staring hard at the approaching passenger, the pilot began to tremble. "Fred, I don't feel so good. Go back and ask that flight surgeon if he'll step up here."

Downwind Approach

A UH-1D, WITH a crew of three and eight troops with bedrolls aboard, was flying the third slot in the third platoon of a formation approach to a landing zone. As it began to terminate at an approximate 3 foot hover, the rpm dropped and the aircraft commander ran out of left pedal. The helicopter pivoted to the right into the wind and fell through, striking the ground several times, on first one skid and then the other. These impacts caused extensive damage to the attachment points and skids.

Task Force commander: " . . . My estimate of the weather at the time of the landing . . . was 800 feet overcast, 5 miles visibility. I estimated the wind to be out of the east northeast at 5-7 knots. At about two miles out on final I instructed the leader of the formation to change landing direction from north to northeast and I cautioned the entire flight of a quartering tailwind landing. Upon touchdown, I was flying Green 2 of the same platoon and I noticed that several aircraft on the left side of the formation had problems in maintaining directional control. Green 3 turned about 100° to the right, rolling violently from the left skid to the right skid. The aircraft was shut down and I inspected it and found structural damage underneath the fuselage near the rear cross tube."

Flight leader: " . . . The prescribed flight route was followed, generally north, to the landing zone. En route, I do not recall having to crab excessively off the true heading. Over the RP, I directed the third and fourth platoons to fall back for separation, as previously planned and briefed, while the first and second platoons continued inbound to the landing zone. At this time, the CO broadcast instructions to land as close to northeast as possible. Because of the layout of the landing zone and the obstacles in and around it, I had to land the flight to the north. I had no difficulty with termination due to wind. Of course, being in the lead, I was operating in clear air. The first time I knew of difficulty in the landing zone was via radio as I was departing."

Platoon leader: " . . . We were the third platoon in a four platoon flight. At the RP, the third and fourth platoons slowed to 60 knots to give some separation in the landing zone. At one-half mile on final, I saw White 3 do approximately two 360° turns at a hover. I also saw White 4 have a hard landing. I suggested to Orange 1, the platoon following mine, that he be prepared to go around. I also told Green flight to exercise extreme caution. We continued the approach and Green flight landed. After landing, I looked around at the flight . . . I saw that Green 3 and Green 4 had apparently turned 135° to the right on landing. I called and suggested that they shut down and check their aircraft."

crash sense

Hard downwind landing caused extensive damage to skids and attachment points

Aircraft commander: " . . . I was flying in the left seat . . . We were assigned the third slot in the third platoon . . . I took control and had been flying for about 10 minutes when a call came over the radio that the landing into the landing zone would be downwind. I do not know who gave the information. About 3 minutes later, we were on final for the landing zone. About one-half mile out, at an altitude of 100 feet, we were down to 25 knots airspeed. I made a comment to the pilot, 'I wonder if they're going to get any slower.' The pilot said, 'If they do, it might get rough.' On short final, we were at about 10 knots, making a shallow power approach.

At this point, the pilot advised me that we were starting to lose a little rpm. Just before termination, at about 3 feet, I ran out of left pedal and power at the same time. The aircraft spun to the right and fell through. It seemed to hit the ground with the right side down. From this point on, I concentrated on trying to keep the aircraft in a level attitude. I believe we bounced twice and came to rest on a heading of about 100°. The approach had been made on a heading of approximately 360°, in what I estimated to be a direct downwind of 10-15 knots."

Investigation board analysis: "Due to the available power and the absence of problems on takeoff, together with the fact that several other helicopters had basically the same problem on landing, the possibility of engine malfunction being a cause factor was ruled out by the board.

"The rigging of the antitorque system as a cause factor was ruled out by the board as a result of a rigging inspection and the fact that the aircraft performed at near maximum power during takeoff without ill effect.

"The board feels that landing the formation of aircraft with a quartering tailwind, or downwind, was a definite cause factor in this accident. This is substantiated by the fact that several other aircraft in the formation had basically the same difficulties —insufficient power and directional control difficulty. Both are common problems under downwind conditions.

"The near maximum gross weight, with the resulting lack of an abundance of reserve power, aggravated the situation in this downwind landing, but should be considered only as a contributing factor in this particular accident.

"The fact that the aircraft landed in formation is considered by the board to be a contributing factor in the accident. This is substantiated by the fact that only the aircraft on the left side (downwind side) of the formation had problems. We feel this was caused by the disturbed air from the aircraft

. . . the downwind landing was caused by an error in judgment on the part of the formation commander

on the right being directed to the left side of the formation by the quartering tailwind. The excessive amount of disturbed and turbulent air decreased the efficiency of the helicopters on the left side, resulting in insufficient power being available, with an ultimate loss of directional control.

"Pilot technique is not considered a cause factor, because the formation was led into the landing zone downwind, into the conditions described above.

"The board feels that the lack of sufficient separation was a contributing factor. The platoons were instructed to obtain separation, but had insufficient time from the RP to the landing zone in which to obtain it. This lack of separation between platoons contributed to the turbulent conditions and left the second and third platoon leaders in a position where they were unable to properly evaluate the situation in time to take corrective action.

"The board feels that the downwind landing was caused by an error in judgment on the part of the formation commander. This was brought about by a lack of adequate weather information in the landing zone to make a correct decision. . . . The flight commander knew the general direction of the wind, but obviously misjudged the velocity the aircraft could withstand in landing. With the actual velocity of the wind not available, he chose to land, as briefed, into an undesirable condition.

"The board recognizes that discipline in formation flying is a necessary tool in providing the ground commander with the means of simultaneously massing his forces on the objective. We feel, in this case, that the company commander made a logical decision based on available information; also, that individual pilots were adhering to flight discipline, as taught, in not breaking formation without a strong reason."

Only Available Terrain

A U-6A, with a pilot and four passengers aboard, took off for the return leg of a cross-country flight.

Pilot: ". . . As I crossed the mountain range, at 3,500 feet, I called operations to tell them that I was 8 minutes out. Immediately after that, I heard an OH-23 pilot calling operations, but he could not reach them. I called him and asked if I could relay his message. Just as I finished speaking, the engine began to run rough and vibrate.

"I thought at first that I had run the middle fuel tank dry and reached forward to switch fuel tanks. As I did, I saw the chip detector warning light was on. I called the OH-23 pilot and told him I was in trouble and gave him my approximate position. Then I tried to see if I could gain control of the engine with the throttle and propeller lever. I reduced throttle and it seemed to have no effect. I tried adding power and this also had no effect. The engine was vibrating wildly and I could see the cowling bending and twisting as it jumped up and down.

"I tried pushing the prop lever forward, think-

Photo shows mountainous terrain over which U-6A was flying, portion of sand bar, and rocks struck by aircraft

Impact with rocks caused damage beyond economical repair and aircraft was salvaged

ing that this would ease the load on the propeller, but it only made the engine vibrate more violently. I thought for a moment that the engine was going to fall off the aircraft completely. At this point, I elected to make a forced landing and pulled back the mixture to kill the engine. It seemed to have no effect and I felt that the engine was still trying to run. I then pulled up the emergency fuel and oil cutoff. Still, the engine seemed to be running and I turned off the fuel valve and magnetos.

"I turned to the passengers and told them that we were going to land and to tighten their seat belts. At this time, I was about 3 miles west of the sand bar that I had lined up on. Up to this point I don't remember trying to reduce airspeed. I looked down and it was still about 100 knots. I pulled the nose up and reduced airspeed, then made another call to operations and told them I was going to land on the sand bar. I shut off all the switches and again told the passengers to tighten their seat belts. I could see that I would make the sand bar and lowered flaps.

"As we were about a mile out, I lowered more flaps. The aircraft floated as I rounded out, hit and bounced, then hit and bounced several more times. I could see that I was going to run out of room. Two large rocks were almost dead ahead and I think that I tried to avoid them. The aircraft hit the smaller rock and slid up over it, as it came to rest. I told everyone to get out and run away in case of fire. We all got out of the doors and ran down onto the sand. . ."

Interior view of no. 9 cylinder shows damage to cylinder barrel, counterweights, and connecting rods

After the accident, the investigation board president and another member of the board flew the flight route of the U-6A to check the appearance of the forced landing area chosen by the pilot and the availability of other landing areas. The area was examined on foot, from an airplane, and from a helicopter. All board members agreed that the area selected was not only the best, but the only area available to the pilot. The rice paddies in the area were too small and frozen over. A check with the unit training officer and the pilot revealed that this area had been preselected in safety meetings as the only area for a forced landing on this segment of the flight route.

Investigation board analysis: ". . . The engine malfunctioned in a manner which caused all link rods to separate from the master rod assembly and the no. 9 cylinder head to split and separate from the cylinder barrel.

". . . The forced landing was executed in difficult terrain and the emergency procedures followed by the pilot were satisfactory, except that he failed to monitor his airspeed closely enough. Rounding out with excess airspeed on a downslope, he was unable to stop the aircraft in the space available and it bounced and floated for 676 feet before it slid up and over a large rock. . ."

Flight Surgeon's Report

Four UH-1Ds departed on an administrative flight to deliver cargo.

Pilot: ". . . We were on the ground a very short period of time after unloading our cargo. Due to the approaching rainstorm just north of the field, the flight took off at 1830 hours bound for a refueling point before continuing on to our destination. Minutes after takeoff, the lead ship, with us following, turned slightly to stay clear of the weather. Shortly after this, the lead ship passed from sight and the pilot broadcast that he had started a right turn on instruments. Seconds later, my aircraft commander radioed that he had the shore in sight. At this time, I looked over to the left and could see the shore and a mountain which was above us. I looked back and we struck the surface of the sea about 200 yards from shore. I believe that we hit the water at a flat attitude and the aircraft immediately pitched over on its nose and lay upside down in the water in a nose low attitude. I released the lap belt as the motion stopped, felt a falling sensation, and released my steel chest protector. My hel-

met came off on impact. I think I pushed myself through the opening where the windshield or chin bubble would be. . ."

Flight surgeon: "This accident was born at the point of departure when the flight of four UH-1D helicopters took off on a routine round robin mission in a loose diamond formation. The flight down took 1.4 hours.

"On the flight down a storm was noted over the mountains to the west, but visibility was satisfactory. Thirty to 45 minutes were required to unload the aircraft. Since the weather appeared to be deteriorating, the aircraft commander of the lead aircraft suggested that the flight crank up and head out. This was essentially all the briefing that was given prior to takeoff.

"There was some confusion as to who the flight commander was. The ranking officer in the lead aircraft was assumed to be by some of the members of the flight. Others thought that the aircraft commander of the lead aircraft was the flight commander. The crews of aircraft numbers 1, 2, and 4 thought the formation for the return flight would be a trial formation. The crew of number 3 thought it would be a loose diamond.

"Liftoff was at 1815 hours on a northeasterly direction. Visibility was approximately 10 miles, but this gradually deteriorated until the crew of number 3 aircraft, 150 to 200 yards to the left rear and higher than the lead aircraft, could only see it indistinctly, even with the aid of the windshield wipers. The pilot of number 2 aircraft elected not to use his windshield wipers.

"At approximately 1825 hours, with the entire flight in a gradual descent of 500 feet per minute, the lead aircraft could no longer be seen by the remainder of the flight. The aircraft commander of the lead aircraft informed the flight, after he had disappeared from view, that he was making a climbing right hand turn and was on instruments. The pilot of number 3 aircraft attempted to remain VFR by making a tight turn to the right. His altitude varied from 500 feet entering the turn to 200 feet at the completion of the turn.

"The pilot of number 4 aircraft elected to turn left and follow the beach back to the point of departure. The pilot of number 2 helicopter, who was to the right of the flight, lower (150-200 feet), and slightly to the rear of number 3, announced he had the shore in sight and would proceed. Number 2 aircraft continued in a northeasterly direction, without a significant change in power setting. At approximately 1825-1830 hours, less than a minute after the pilot's communication, it crashed into the sea.

"Both the aircraft commander and pilot denied difficulties with each other, family, friends, superiors, or subordinates. Both had adequate rest (8-10 hours) the night before the accident. Both had a light 8 hours of routine duty the day before the accident. Both had an adequate meal before the accident.

. . . the aircraft commander of the lead aircraft led his flight into IFR conditions which were beyond the capabilities of every member of the flight

"The main cause factor, of course, was that the aircraft commander of the lead aircraft led his flight into IFR conditions which were beyond the capabilities of every member of the flight.

"Confusion as to just who was the flight commander was a major contributing factor. The aircraft commander of the lead ship, by policy, should have been the flight commander, but this was never made clear to him prior to takeoff, and the ranking officer in the lead aircraft took on the responsibility when he was permitted to brief the flight prior to takeoff. It is obvious that neither were sure just who was responsible, so both, hesitantly, did a little leading.

"This hesitancy in assuming command by the aircraft commander permitted the flight to blunder into IFR conditions. Indeed, the aircraft commander did make a feeble effort to act the part of flight commander, but only after he had flown deep into IFR conditions and was lost from view to the rest of the flight. This laxity in standardization of procedures and policy can only be corrected by training and command direction. It is obviously not sufficient to assume that prior training, knowledge of regulations, directives, and policy is adequate. These points should be restressed in periodic safety meetings. No safety meetings were held in the unit during the month and a half preceding the accident.

"The preflight briefing consisted of the aircraft commander of the lead aircraft saying, 'Let's crank up and get out of here before the weather closes in,' or words to that effect. This was more of a suggestion, rather than a briefing. Since there were no dissenting opinions voiced, that is exactly what they did—cranked up and left. No specific instructions as to the type of formation to be flown was made. Some of the members of the flight then assumed a trail formation, others a loose diamond. By policy, a diamond formation is used in marginal weather conditions. The worse the weather, the tighter the diamond should be. Apparently, the policy was inadequately understood by the members of the flight.

"The decision of the crew of the number 2 aircraft not to use their windshield wipers when the other members of the flight felt that it would be impossible to see without them is difficult to explain. It must have decreased the aircraft commander's visibility or, worse, distorted it so much that he felt he was higher than he really was. If it is not unit policy to use equipment such as windshield wipers in rain, such a policy should be made. Better still, criteria should be so clearly established that even new and inexperienced pilots, such as this aircraft commander and pilot, can understand it and follow it to keep themselves out of IFR conditions beyond their ability and training.

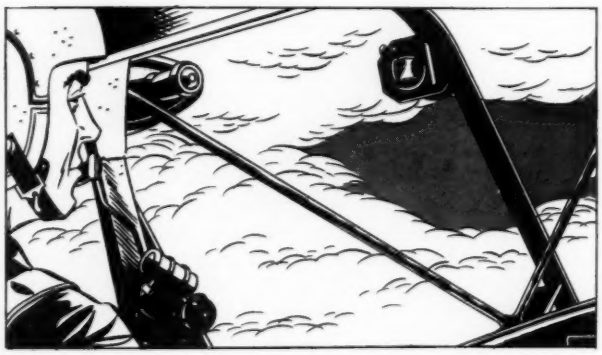
"Both the aircraft commander and pilot demonstrated a bizarre complacency under ever worsening weather conditions. There apparently was no discussion as to just what the responsibility of each would be. It is understood that the aircraft commander is responsible for primary control of the aircraft, that he is to maintain visual contact with the lead aircraft, and maintain his position in formation, which, in a diamond, would be above the lead aircraft and to the right rear. He was to the right rear of number 3 and lower than both the lead aircraft and number 3 aircraft, and his altitude was estimated at 150 to 200 feet. The aircraft commander and pilot didn't communicate about anything during the entire flight. Neither was aware that they were in a gradual descent of approximately 500 feet per minute. Neither was aware of their critically low altitude.

"The gunner saw that the aircraft was descending, but assumed that the pilot intended to contour over the water and said nothing. In fact, he was only aware of their desperate situation when the right skid hit the water.

"It is the responsibility and duty of the pilot to keep the aircraft commander informed. Being able to do only what one is told to do is the mark of a barely adequate follower, not of a leader, and certainly not the attributes demanded of a pilot flying under difficult circumstances. Complacency has no place anywhere in aviation. Retraining can correct improper techniques, but it can never correct an improper attitude towards flying. Such pilots are a flying hazard, not only to themselves, but to all who fly. My interview with the pilot left me with the impression that he just couldn't be bothered, or, for that matter, really didn't care why the accident occurred. He is incapable of assuming any responsibility for the accident. He is immature, inexperienced, and, worst of all, complacent about aviation. Retraining the pilot would only increase his technical ability. It would not make him aware of his responsibility to aviation.

"It is policy that overwater flights that are beyond the capability of the aircraft to autorotate to land must have a life vest for each crewmember and passenger. It would be far better if life vests were carried at all times, since flares and other signaling instruments are part of, or can be attached to them. In this case, rescue could have been effected many hours sooner had they been available.

"It was fortunate for the aircraft commander that a crew so poorly versed in first aid did nothing but make the patient comfortable. His boot acted both as a splint and a compression dressing. Had it been removed, morbidity would have been much more marked."



Left to 150 Degrees

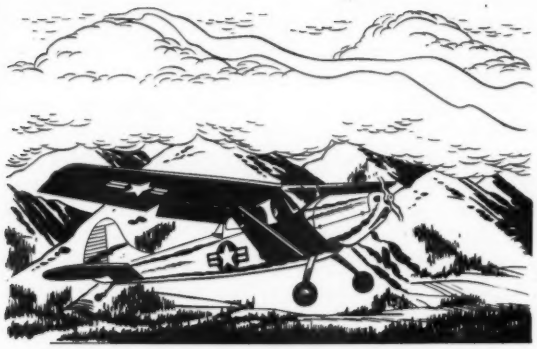
An O-1A pilot filed a 6 hour and 30 minute flight plan for a round robin flight to drop a passenger at the destination and return to the point of departure. The flight plan estimated 3 hours and 15 minutes outbound, an hour on the ground, and 2 hours and 15 minutes for the return flight.

Pilot: ". . . The flight was laid on for a 0800 hour takeoff the following day. VFR weather was forecast.

"I arrived at the flight line a few minutes after 0700 and the field was IFR. The forecaster said that a layer of fog about 1,000 feet thick was lying over the coast. The weather to the west was good and the field was expected to go VFR at 1000 hours. The fog did not break up as fast as expected, and did not start to lift until about 1230. At this time, I went to operations and filled out a flight plan for a 1300 hour departure. At 1330, operations called and said that the field was VFR. I gathered my maps, helmet, etc., and went to the aircraft. I had already preflighted so I untied the aircraft and checked my passenger to see that he had properly fastened his seat belt and shoulder harness and was wearing a helmet. We took off at 1345.

". . . We landed at our destination at 1645 hours and I had a cup of coffee while the aircraft was refueled. . . I was cleared to take off at 1715 hours, took off on runway 9, and broke traffic to the left, climbing to 5,500 feet. I was at the bottom of the ceiling at that altitude so I descended to 4,500 feet.

". . . I descended to 3,500 feet to pass through an industrial area. . . As I tuned in a nondirectional beacon, I saw some light showers to the southeast. A little later, I entered a cloud and descended to 3,000 feet. I was in the cloud approximately 2 seconds.



"I passed to the northeast of the nondirectional beacon, encountered a slight downdraft, and climbed to just above 3,000 feet. I decided not to descend below 3,000. If the weather got any worse, I planned to go to one of three cities.

"I saw some clouds to the east so I turned to the south to see if they got any worse. . . After turning south, I passed to the west of a rotating beacon. The clouds disappeared and I saw some lights on the ground about 3 miles away. The lights were off my right front. Seeing no more clouds at my flight level, I tuned in a low frequency range and turned to the left to 150°.

"I have no further recollection of flight. The next thing I remember is that I realized it was important to get the time, so I looked at my watch. I determined the time to be 1855 hours. I then detected an acrid smoke, looked up, and saw a small red flame at the lower right side of the dash panel. I reached out with my left hand to get the fire extinguisher from behind the seat. I pointed the horn with my left hand and pulled the trigger. Later, I checked to see if the switches were off. All switches were down, the magnetos off, and the fuel was off. . . I disconnected the battery.

". . . I decided to stay with the aircraft for the night, as I could possibly have gotten lost or injured in the darkness. I stayed in the cabin section, sleeping on and off. I unstrapped the parachute from the rear seat to help block the door to keep the breeze off. I was aware of a pain in my left ankle and thought it was sprained.

"I awoke during the night and saw some lights in the valley. They appeared to be moving on a road and I estimated them to be a few miles away. I awoke again just before daylight and saw the sweep of a rotating beacon and wondered why I had not seen it the night before.

"After looking at the wreckage I decided that it would be hard to spot from the air and I would have to walk out. Having seen the lights in the valley during the night, I decided to go in that direction. I wanted to take the compass and go in a straight line to a recognizable point. I was unable to unscrew the compass, so I cut through the rubber mounts with a pocket knife. The bearing to the area where I had seen the sweep of the beacon was 360°. The bearing straight down the slope I was on was 330°. I picked up a dead branch to use as a walking stick to help keep the weight off my left ankle. I took the aircraft log book, my charts, and wore my helmet for protection from branches as I started walking on a heading of 330°. After 30-40 minutes, I came to an old logging road and a place where logs are loaded on trucks. I found a stouter walking stick and followed the road. I traveled slow because of the ankle and when I stopped to rest it seemed to hurt more and it was harder to get started again. I decided to go slow with no stops until I could reach a house and telephone.

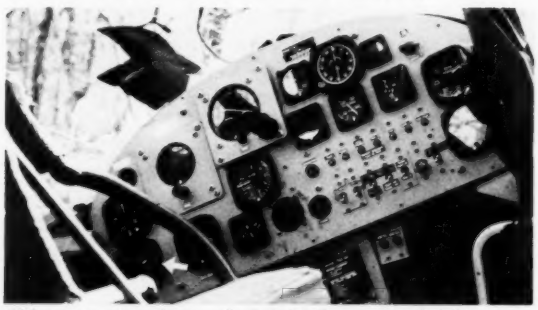
"After about 3 hours I came to a hard surface road and saw a house about 150 yards away. I walked to the house, knocked on the door, and asked the people if I could use the phone. I had some difficulty as I had a lacerated lip. The man from the house drove me to the state police office and a state trooper took me to the local hospital and called the military authorities."

Aircraft accident investigation board analysis: "Two regulations were violated during the course of this flight. (1) Paragraph 16, AR 95-2, requires that whenever practicable, VFR position reports will be made normally each 60 minutes. Reports could have been made at various places along his route, but no VFR position reports were made during the entire flight. Had the pilot been seriously injured, it is doubtful that immediate rescue would have been made. (2) FAR 91.105 (a) (2) requires separation within controlled airspace of at least 500 feet below, 1,000 feet above, and 2,000 feet horizontally from any cloud formation. The fact that the pilot entered a cloud, though only for a few seconds, was in violation of regulations.

"En route weather provided on DD Form 175 was valid for operations under visual flight rules. Weather at the various stations along the route and in the vicinity of the crash area were reporting conditions above those required for operations under visual flight rules. However, the pilot encountered

crash sense

O-1A collided with mountain at night in marginal weather when pilot misread altimeter by 1,000 feet



Altimeter on panel of crashed O-1A shows exact height of mountain where crash occurred

clouds and found it necessary to deviate from his altitude and flight path in an effort to remain under visual flight conditions.

"Often, in areas of terrain characterized by mountains and valleys, ground fog conditions develop and are not necessarily reflected in weather observations at area reporting stations, unless it appears at the reporting stations or is reported by pilot observations. The weather condition in the area of the crash on the night this aircraft struck the mountain was characterized by fog. The fact that the pilot failed to see the red obstacle lights on a 175 foot tower to his right front and the sweep beam of the rotating beacon to his left indicates that those obstacles were obscured by a weather condition.

"The aircraft altimeter was not in error and was found to be within allowable tolerances during tests conducted at an Army depot. The photograph taken of the aircraft instrument panel showed the altimeter clearly and it was reading the elevation of the crash site. The pilot stated he set his altimeter on 1,228 feet prior to takeoff for the return leg. The altimeter setting at the site of the crash supports the fact that the altimeter was set properly. The pilot stated he was at 3,000 feet. Since he crashed at an altitude of 1,960 feet, he obviously made an error in reading his altimeter or failed to identify his position with respect to the terrain over which he was flying . . .

"The terrain over which the flight crossed did not have many lighted cities or clear cut distinguishable terrain features. However, there were three rotating-type light beacons along the route and they were defined on the sectional charts. Additionally, there were nondirectional beacons in the area from which to determine bearings. The pilot had been using the nondirectional beacons, but he was able to identify only one rotating light beacon. He stated that he passed west of rotating beacon number 9 while on a southerly magnetic heading. Actually he could have been passing west of rotating light beacon number 8. These points strongly suggest that the pilot was disoriented and knew only his general direction. The exact location and altitude become critical at night over mountainous terrain when visual flight conditions are questionable.

"The weather forecaster recommended that the pilot recheck en route weather at the destination airport prior to beginning the return portion of his round robin flight. This was not done. Though there were no major changes in the reported weather, the pilot showed poor judgment in not rechecking the weather, particularly since his time en route totaled more than 6 hours.

"The pilot's failure to make VFR position reports during the flight and his entry into a cloud while under visual flight rules reflected a lack of flying discipline."

Flight surgeon: "It should be emphatically stated that this aviator was spared serious, major, or even fatal injury as a result of the use and effective operation of his safety equipment items.

"The helmet was fitted and worn properly. The chin strap was fastened prior to and after impact. The helmet did not shift significantly as a result of the impact, although the rear wire lead grommet was torn loose, apparently as a result of horizontal forces. No skin area covered by the helmet was injured. The same holds true for his glove protected hands. Needless to say, if his belt and harness had not functioned, we would have found him outside the aircraft. *Most important,* in this particular setting, were the pilot's boots. As a result of twisting force to the left rudder pedal, his left ankle was sprained. I sincerely believe that had he been wearing low quarters, he would have sustained a serious laceration and fracture of the left or right lower leg, ankle, or foot."

Nonstandard Maneuver

Pilot: "I called flight scheduling and asked for an OH-13E for proficiency, then called a buddy and asked him if he would like to go with me. We took off and flew north. My friend had never seen armed helicopters fire, so I headed for a range which was firing. As range officer, it was normal practice for me to check the range area by helicopter.

"We stayed at the range approximately 50 minutes, then I took off and flew to a nearby field. I shot several approaches and hovered around the field, then set the aircraft down and checked the fuel with the dipstick. There were still 20 gallons left in the tank, and I took off and shot several approaches, followed by a deceleration.

"I made a normal takeoff and attempted to abort at about 20-30 feet. I raised the nose to slow the aircraft and it was decelerating normally in a nose high attitude when it suddenly seemed to lose all lift. It fell vertically and the tail rotor hit the asphalt lane. By this time, I had applied full power and pitch. The aircraft then hit on the front of the skids and came to rest upright."

Passenger: "When we arrived at the field, the pilot made an approach for a hover and flew the aircraft around the stage field for a few minutes at hover altitude. After selecting an open area in the middle of the field, I was given an opportunity to practice hovering with the pilot near the controls or on the controls at the time. After flying the aircraft at hovering altitude for a few minutes with instructions from the pilot, I was demonstrated what I understood to be a normal takeoff. After the demonstration, I attempted two takeoffs, with one being aborted at about 20 feet by the pilot. After the other takeoff I flew around a rectangular pattern to the 180° side point. I never made an approach from an altitude higher than a hover. The total time I had control of the aircraft, counting the two takeoffs and hover maneuvering, was approximately 10-15 minutes. The pilot was either very close to or on the controls all of this time."

Drive shaft was sheared by impact when helicopter fell through from aborted takeoff

Aircraft accident investigation board conclusions:

"There was no mechanical malfunction of the helicopter or its systems.

"The pilot used poor judgment by practicing decelerations at an altitude between 30 and 50 feet when a high density altitude (2,150 feet) existed and the helicopter required red line power to hover.

"The primary cause of this accident was pilot error in that he decelerated the helicopter at a low altitude out of ground effect and entered a settling-with-power condition from which there was insufficient altitude to recover.

"A contributing factor was that the pilot lacked the necessary proficiency in the OH-13 to perform the maneuver he attempted.

"Recommend the pilot be given a post-accident checkride, emphasizing the limitations of OH-13 helicopters.

"Recommend the aborted takeoff maneuver be prohibited except when demonstrated by qualified instructor pilots during standardization training."

Statement of reviewing official: "Concur with the findings and recommendations of the aircraft accident investigation board.

"Although not factually substantiated in the report, there are indications this pilot may have committed the following acts which led up to and contributed to the accident:

"a. Giving unauthorized flight instruction.

"b. Exhibiting aircraft and pilot capabilities.

"c. Performing hazardous maneuver with a passenger on board in violation of paragraph 30, AR 95-1.

"d. Attempting to demonstrate a nonstandard maneuver which exceeded his capabilities."

Statement of approving authority: "Approved with the following additional comments and recommendations:

"Practice aborted takeoffs and autorotations during climbout from takeoffs should be prohibited, with the exception of hovering autorotations, or as required during formal training with qualified instructor pilots. This restriction is being written into this Army's regulations.

"Major commanders within this Army have been directed to inform all aviators that basic flight instruction is authorized to be conducted only at an appropriate aviation training school during a formal course of flight instruction."

omni, omni-- Who's Got the Omni?

Major Don Booz, II

I DREAD FLYING. At best I am a somewhat reluctant passenger in military aircraft, a trait dating back to a highly embarrassing incident in a C-124 flying from Korea to Japan (I availed myself of the rather primitive toilet facilities located in the rear of that monster, thus providing a certain amount of amusement to a co-ed USO troupe seated on the tier above me).

The only time I feel any reassurance is when, upon reporting to any airfield, one DC-3 is somewhere on the flight line, holding its nose up proudly like a rich but eccentric aunt. Flanked by sleek 707s or matronly DC-6s though it may be, the DC-3 still remains one of the truly honest and legitimate looking planes ever built. Beside it, all others are Edsels.

Too, I don't have to ask which airplane I am going on when I see one. She's for me and I for she. The 707s are always occupied by the military equivalent of the international jet set—Ordnance Corps wheels, smoking expensive cigars, on their way to negotiate a purchasing contract for jeeps; AG types flying home to cinch their latest assignments; etc. For them the sleek, faster-than-sound jet and turboprop jobs. For us, it's Hello Dolly—C-3.

One day at Fort Lewis, I was delighted to hear that my flight to Yakima was going to be in a de Havilland Beaver.

It taxied up to the Gray Army Airfield passenger terminal, and the crew came into the lounge for a quick chat with weather, while I killed a quick coffee.

Weather, an Air Force type, told us we'd better be making tracks as there was only one hole in the cloud left for us. (At least that's what it seemed he said, with all the suet trimmed off.)

We piled in, pilot, copilot and lone passenger. After a clearance from the tower, away we went.

Weather was right. We flew through a little hole in the clouds which seemed to close after us, circled for altitude and started off in an easterly direction for Yakima.

Suddenly the cabin filled with smoke—bitter, choking, acrid. The pilot and copilot opened their windows, pulled levers, threw switches, and did everything but the watusi in the cockpit.

One of them kept yelling to the other, "Omni! omni! omni!" Not sure whether this was a Greek prayer or some mystic code word to abandon ship, I quickly checked my seat parachute and safety belt. To my horror I discovered that I had somehow hooked my seat belt into my parachute harness. After correcting this, I looked for a handy exit, just in case the prayer "Omni" didn't work.

On the bulkhead to my right side were very clearly worded instructions to twist a yellow handle for an emergency exit; and this sure looked like a hairy situation coming up, if not an out-and-out emergency. But there was no yellow handle! None on the floor, nor in one of those little pockets on the back of the seat, or anywhere.

By this time the committee up in the driving compartment had turned off the engine, the smoke had disappeared, and they were anxiously peering down at the solid cloud cover beneath us. The copilot turned and said, "We might have to jump!"

"What's the sign to jump?" I asked naively.

"When you look up here and begin feeling lonely, it's time to go," he replied, turning back to his task of pounding on the instrument panel with his free hand.

Somehow, they got the engine started again, without any attendant fire and smoke, and headed the craft down through the clouds. Fortunately, Gray AAF, rather than Mount Rainier, was right below us. We scunched in at a very rapid rate, stopped, and taxied to the maintenance hangers, where a crowd of mechanics were waiting for us.

Seems someone had pressed the starter button while we were flying. They were all standing around arguing about who done it, so I snuck away before they could blame it on me. At any rate, in case of an emergency, pray to omni, and pound on the dashboard. I'm here to testify that it works!

Maj Booz is with the 8th Administrative Company, APO New York 09111.

AAFSS Contract Awarded

THE ADVANCED Aerial Fire Support System (AAFSS) moved into the engineering development phase recently when a fixed price cost incentive contract with an initial increment of $12,700,000 was awarded the Lockheed Aircraft Corporation of Burbank, Calif. The contract encompasses support of all test activities through engineering and service testing.

Conceived and designed exclusively as weapons ships, AAFSS will be developed on an expedited basis. Ten prototype vehicles will be manufactured and tested under this contract. The objective is a stable aerial weapons platform for the primary role of escorting troop carrying helicopter formations and providing discrete suppressive fires.

The AAFSS vehicle is designed to have an all weather, day and night operational capability. It will cruise at over 200 knots and mount various weapons including machineguns, grenade launchers, rockets and antitank missiles. These weapons—consistent with those traditional to the infantry role—will be capable of furnishing highly accurate and continuous fire (as required) against area and point targets.

Featuring latest developments, AAFSS also will include a new integrated helicopter avionics subsystem and new fire control techniques. Another new concept to be used is that of modularized subsystems that will permit variable operating configurations.

The aircraft will have two-man crews (pilot and copilot). The copilot/gunner's station will be forward and include a fully revolving seat and stabilized sight. Sensors will provide all necessary inputs to an on-board computer which will automatically aim the flexible weapons. The pilot also will be able to fire the weapons.

The aerial vehicle will feature the Lockheed rigid rotor which has already demonstrated exceptional stability. The addition of small wings and a pusher propeller makes the AAFSS configuration that of a conventional helicopter. Power will be supplied by the 3,400 horsepower T-64-12 gas turbine engine developed by General Electric.

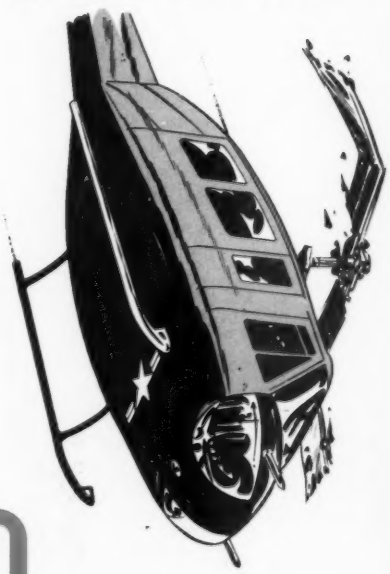
When operational, this weapons system will provide the ground commander with unique and untold new capabilities in mobility and firepower.

Digest Reader Survey Next Month

In an effort to bring you more of what you'd like to read in the DIGEST we are going to include a readership survey as a part of the June issue. We ask that you keep your keen eyes peeled for the survey which will be in the form of a tearout page.

All we'll ask you to do is fill in the blanks, tear out and mail it to the Editor-in-Chief of the DIGEST. The pages will be self-addressed to save you the price of a stamp. Here will be your opportunity to let us know what you like, or what you do not like for that matter, and what you'd like to see more of in the DIGEST—your magazine.

THE VALUE OF A LOOK...

IN THIS MID-AIR COLLISION WITHIN SIGHT OF AN AIRFIELD IN VFR WEATHER WITH 7 MILES VISIBILITY

9 LIVES AND $500,000